PRINTER BLOWOUT! HOT NEW LASERJET 4 vs THE WORLD

The Magazine for Business Computing Experts

PCComputing Output O

Two Book Exclusives!



BILL GATES & DOS His First Billion



25 pg. VISUAL FEAST Inside Your PC

INSTANT POWER!

acrets

It's not surprising that WordPerfect users are switching to Microsoft Word for Windows.

After all, they helped





At last count, more than half a million WordPerfect* for DOS users

have switched to Microsoft Word version 2.0 for Windows. And there are plenty of good reasons why.

First of all, WordPerfect for DOS users helped us create Word for Windows, and actually made it easier.

Throughout the development and how we ca

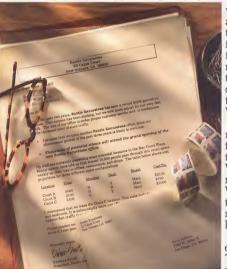
of Word for Windows, we invited WordPerfect users to try it out on the things they do every day at work, like letters, memos, and even big reports. We call these types of sessions "usability studies."

It's an important part of the process we go through in developing all our software. Because "usability studies" help us find out the way in which people use their computers, and how we can make it easier.

In this case, we were able to design a number of innovative and time-saving features into Word for Windows that can make not only the things you do every day easier, but also the transition from WordPerfect.

For example, it reads WordPerfect files. Better yet, just type in your familiar WordPerfect commands and Word for Windows shows you the equivalent commands. So you can learn as you work.

We've also added a customizable Toolbar that gives you one-step access



ool ber chart, which was created in Word for Windson, shows the approximate stall numbers of Word For chart, which was created in Microsoft Word for Windsons each year For more information weale the 12063-266-8661. Customers in Canada, call (800)-869-9648. © 1982 Microsoft Corporation. All rights reserved. Provided in the United States. Microsoft is a registered trademark and Windsons in a tradema.

d define it.

to everyday tasks. And other innovative features, like drag-and-drop movement of text or graphics that lets you easily rearrange your page layout any way you want.

Then, to be sure that all of these features worked for WordPerfect

From November 1989 to August 1992, over half a million WordPerfect users have switched to Microsoft Word for Windows.



users, we had them put to the test in the real world, with the help of the folks at

the National Software Testing Labs.

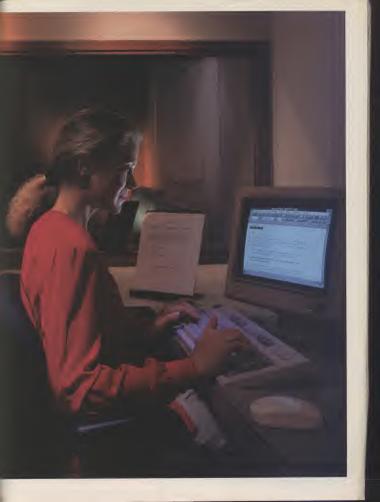
After conducting in-depth tests in 10 cities, from Los Angeles to New York, the National Software Testing Labs discovered that for ease-of-use, nearly 8 out of 10 WordPerfect users chose Microsoft Word for Windows over WordPerfect for Windows.

But WordPerfect users aren't the only ones who prefer Microsoft Word for Windows. Recently, it was awarded "Best Buy" by *PC World*. And the "Editors' Choice" by *PC Magazine*.

For more information on how to make the switch to the leading word processor for Windows, call us at (800) 426-9400, Department HY9. And discover why, for over half a million people, Word for Windows has become the latest chapter in the development of word processing.







IF YOU WANT TO KNOW ABOUT PORTABLES,

IN THE WORLD'S FIRST TRANSATLANTIC BALLOON RACE, THE COMPUADD 325TX CAME TO THE RESCUE!

On September 16, 1992 the world's first transatlantic balloon race started in Bangor, Maine. Each balloon carried a CompuAdd 325TX notebook to link it by satellite to the race control center, provide the crews with the shortest route-to-landfall information and

allow them to send messages. But the most critical mission these CompuAdd portables performed was aboard two balloons that went down in the ocean. Dripping wet and badly beaten up, the CompuAdd 325TN notebook continued to relay their positions—speeding the rescue effort. "The

crews would have had no other means of communicating their position," said Race Director

Alan Noble. But the CompuAdd 325TXs, "kept on working when they were whed in seawater ...despite being ossed around and seriously abused."

COMPUADD 325TX: RUGGED, DEPENDABLE, AFFORDABLE!

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Low power for longer battery life
6.16 pounds, 11.3" x 8.5"
3865XL 25MHz processor
80387 coprocessor socket
2MB DRAM expandable to 8MB
Built-in 3.5" disk drive

Butt-m 3.3" disk drive 640 x 480 VGA resolution with 64 gray scale 80MB hard drive loaded with MS-DOS 5.0 and Windows 3.1 120MB available for 1795

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ASK THE WORLD'S LIGHTWEIGHT EXPERTS.

COLOR!

For the same price other computer companies are charging for a monochrome notebook, CompuAdd brings you 486 power and color - all in a 7 pound package. The CompuAdd 425C color notebook comes with a math coprocessor built in, a full four megabytes of DRAM and SIMULSCAN support so you can run full color presentations on the LCD and a monitor at the same time. You also get a built-in trackball, an automatic sleep key and Microsoft's APM (Advanced Power Management) for longer battery life in DOS and Windows. Plus a unique System Status Window that shows battery level, power management status, modem ring status and more! Choose from an 80MB or 120MB hard drive - either way it's p loaded with MS-DOS 5.0 and CompuAdd Windows 3.1 so you're ready to go!

COMPUADD 425C: POWERFUL, PORTABLE. COLORFUL!

4MB DRAM expandable to 8MB 80387SX Cyrix math coprocessor built-in VGA color LCD 8.5" diagonal screen (640x480) 3.5" 1.44MB floppy

1 parallel, 1 serial, external keyboard and VGA ports

Built-in trackhall 82-key keyboard emulates 101-key layout 11.6" x 8.2" x 1.8"

Travel weight under 7 pounds Optional 2400 baud modem with 9600 baud send/receive fax mod 80MB IDE hard drive (120MB available for \$2795)



Of course, luck won't get them far. Because the new HP LaserJet 4 printer sets such high standards for performance, value and ease of use that no other laser printer comes close.

Higher resolution. More typefaces. With the HP LaserJet 4, HP has moved the standard for print quality from 300 dpi to

600 dpi. That's twice the old resolution, but at less than the old 300 dpi price.

The HP LaserJet 4 was designed for 600 dpi printing from the ground up. Which gives you the best 600 x 600 dpi resolution ever for noticeably crisper, clearer text and graphics.

Add microfine toner and HP's exclusive Resolution Enhancement technology. and you get razor-sharp edges and much smoother curves. For impactful documents that really stand out.

You can dress them up with 45 scalable typefaces built right in. No matter what kind of document Total Study creen you're producing, your needs are text and graphics covered. You'll also find it is easier and cheaper to use. You don't.

have to hassle with downloading fonts or buying accessory typefaces. More speed, trays,

and flexibility. Thanks to a highspeed RISC processor the HPLaserlet4 also sets new standards

for speed. It prints many complex documents at rated engine speed, and many 600 dpi graphics print at a true 8 pages per minute. It's faster on networks, too. And has 2 MB built-in memory and

Ribbit

new memory management.



typefaces let you produce a broad



Introducing the HP LaserJet 4. Good luck, fellas!



It also makes you more efficient. Two standard paper trays give you a 350sheet capacity. And there's an optional 500-sheet tray. So you can just keep on printing, instead of stopping to reload different sizes and types of paper.

With the new optional 75-capacity envelope feeder, you won't waste time with manual feeding. Or dealing with jams.

Faster Windows. True WYSIWYG. Windows printing, for both text and graphics, is much faster with the

graphics, is much faster with graphics and the Laserelet 4. We use fast we cor graphics and we built Windows 3.1 Trueflype fonts right into the printer. This means documents print aster and What You See Is really What You Get. It's noe simple, seamless operation. All you do is sit back and watch your screen door in which we have the work of the work of

easily and accurately on paper.

You can't beat the Laser.let 4 printer for compatibility, either. It works with a wide variety of LANs and computers, as well as HP's PCL 5 printer language and



HP's optional PostScript
Level 2 software from
Adobe. And automatically switches between
these languages.

And, of course, it offers complete document and software compatibility with the HP LaserJet III printer.

Setting the standard in price, too. With all these advances and more, you'd expect a big jump in price. Surprise! At just \$2,199* the HP LaserJet 4 printer lists for less than the printer it replaces. Yet it still

comes with pace-setting HP quality and reliability.

Call 1-800-LASERJET (1-800-527-3753), Ext. 7132 for the name of your

nearest authorized HPLaserJet dealer? Also ask for a print sample so you can see for yourself how great the output really

looks.**



If it isn't a LaserJet, it's only a laser printer.



PCComputing



114 201 Windows Secrets

MATHEW LAKE, DYLAN TWEENEY, JOHN TASCHEK Turbo-charge your Windows applications! PC/Computing's Windows experts reveal 201 timesaving tips, tricks, and techniques that insiders use to get the most out of 39 top Windows applications. Here in our second annual compendium, we've distilled hundreds of ideas down to the essential pointers most likely to put you in charge of the Windows programs you use to meet your business needs—from spreadsheets to word processors with seven other categories in between.

238 LaserJet 4 vs. the World

CYNDY BATES

Hewlett-Packard's new LaserJet 4 just blew up the laser printer playing field. The LaserJet 4 boasts four times the resolution of a LaserJet III, built-in Windows "Turel'ype fonts, and an unbelievably low price. Is this the best printer bargain ever? We pit the challenger against the ten top contenders to find out if any other printer comes close.



262 Bonus Book Gates: Part 1

STEPHEN MANES AND PAUL ANDREWS

How did Bill Gates become the richest man in America? How did he turn someone else's thorny operating system into a fortune that exceeds the GNP of some small countries! Find out in the first of a two-part exchasive preview of the definitive blography, Gates: How Microsoft's Mogul Reinvented an Industry—and Made Himself the Richest Mom in America.



281 Bonus Book How Computers Work

RON WHITE AND TIMOTHY EDWARD DOWNS

Get inside your PC! Take a tour through the inner workings of your computer and its peripherals in this exclusive excerpt of the new book by PC/Computing's How It Works gurus. Lawish illustrations and straightforward step-by-step descriptions make complicated technology easy to understand.

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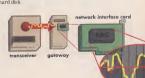
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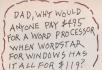
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BALLS AND WINDOWS HAVE NEVER GOTTEN ALONG.

INTRODUCING THE FIRST MOUSE FOR WINDOWS THAT NEVER NEEDS CLEANING!

Balls and windows don't mix — whether its in houseware — or software. That's why we introduced the new Honeywell mouse. It's designed to make you more productive with your Windows" operating system.

Here's why: A ball mouse picks up dust and dirt that can roll up and contaminate the internal mechanism, which makes your cursor hop, skip and

mechanism, which makes your cursor hop, skip and jump across the screen. And when you think you're opening one window, your mouse may be going to another one. So, we replaced the ball with two "feet". Our unique, patented design keeps the mouse free of debris. You don't need any special pads, and you never need to clean the mouse. Plus your cursor will go precisely where you want it – when you want it – forever.

In fact, we're so sure the new Honeywell mouse will outperform your current mouse that it comes with a limited lifetime warranty.*

So, quit dragging your old fashioned ball mouse around, and get a new Honeywell mouse. You may not always get along with your software, but your mouse should.

For information on where to get the new Honeywell Mouse call us at 1-800-445-6939.

Honeywell

Helping You Control Your World

Keyboard Division 4171 N. Mesa Bldg. D El Paso, TX 79902 (915) 543-5566.
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Circle 136 on reader service card.



In 1985 NEC pioneered multiple frequency technology with our MultiSync monitors. Six years later we redefined the standard with the FG series.
A line of advanced monitors compatible with MS-DOS® as well as Mac[®] II and

Mac Quadra™ systems.



The revolutionary MultiSync® 3FGx™ monitor. The future has never looked brighter. Or sharper. Or more accurate. Or m

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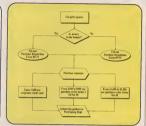
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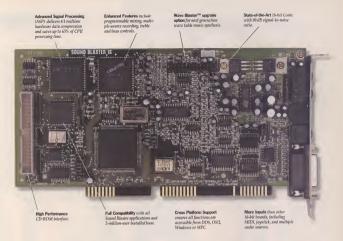
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Introducing Interface Lite—The Third Wave of Software Usability

IF YOU PUSH USABILITY TESTING TO THE LIMIT, YOU CAN refine a user interface so thoroughly that it practically disappears. And that's not such a bad idea.

At PC/Computing, we've spent tons of time thinking about user interfaces and usability. Last year, our editors logged more than 100,000 miles in visits to 14 usability testing labs. We've gathered intelligence for feature ar-

ticles, developed test scripts, and sketched floor plans for our new in-house Usability Testing Center. In fact, our usability tests defined the make-or-break differences between PC Tools and Norton Utilities in this month's faceoff (page 314). Both are mature, powerful, and versatile collections of essential utilities.

versatile collections of essential utilities.
Judging by the mail we get, you've been
thinking about usability, too. As a social science, usability testing may still be in its infancy, but software developers have been reacting to
usability complaints—haphazardly, and usually for strictly

economic reasons-for years. To figure out how we got

where we are, lefs trace the evolution of usability testing, in the beginning was the challenge. The first wave of usability improvements had nothing to do with the basic interface. Software was supposed to be hard to use. Helping users climb the learning curve quickly was the sine qua non of the enlightened software house. Take a classic DOS application like Word Perfect 42. Mastering 40 function-key assignments was like learning to communicate in sign language—a struggle at first, but simple once your fingers were trained. It's no accident that WordPerfect pioneered the concept of online help and turned the tutoral into an

art form.

The second wave was for the buck. Software developers responded to usability feedback by modifying the interface itself, with the explicit goal of helping users quickly tap to power under the hood. Lab-based testing is a perfect way to identify potential improvements. For examples, look at the latest version of any leading Windows word processor. Automated print-merge engines, buttool have, and Smart Lorons are all ways to walk

us through complicated features. Of course, the real motiva-

tion is to trim the average time of a tech-support call.

The hird wave is for us. Now, in the third wave, developers are beginning to make programs more powerful by hacking away hig chunks of the interface. Take Excel 40, are guably the most usable business application around. With its AutoFill, AutoFornat, and orga-and-drop editing features. Excel greatly simplifies some of the most common spread-sheet activities. Instead of expanding the interface with extra dialog boxes and explanations, this approach bypasses menus and buttons.

The OLE story. For an even better example, look at Version 2.0 of Windows' object linking and embedding standard, which ought to be showing up in applications about now. OLE is an incredibly powerful way to tie data together using multiple Windows applications, and scores of applications.

support it. But if you want to use OLE the way it was implemented in Version 1.0, be prepared to slog through a truly bewildering interface.

OLE 1.0 in your face. Consider how the two versions of OLE deal with this everyday business scenario: I want to incorporate a budget worksheet into a monthly report. The bean counters prefer their data in Excel, while the button-down types in the executive suite work only in Word for Windows. Cratchit in the Controller's Office will make me rerun the numbers at least six times between now and

Friday. And Smith in Corporate Communications won't sign off on the text until I've polished every sentence.

The best way to keep both chunks of data in one place, ready for quick version, is to mebet the worksheet directly in the report. Using OLE 1.0, I open Excel, highlight the range to paste, and choose Copy from the Edit menu. Next, I switch to Word, position the cursor where I want the budget data to appear, and choose Paste Special from the Edit menu. I have to choose Microsoft Excel Worksheet Object from the popul psit—oddy, it's not the default.

Now the data's embedded in my document. It looks like a spreadsheet, but if I click anywhere within the rows and columns, I highlight the entire embedded range. And if I double-click on the embedded data, it fires up a session of Excel, obscuring the document I was working on and foreing me into a new environment. And I'd better not forget to update the embedded object before I quit either application, or . . . well. I'm not sure what will hancen.

Now, developers improve programs by hacking away at the interface.

OLE 2.0: Interface Lite. With OLE 2.0-capable versions of Excel and Word, I can copy and paste the data just like before, or drop the file object directly into the Word document. When Cratchit asks me to increase gross margins, I can edit the rows and columns of numbers in place, without switching applications or losing the context of the report. And if I want to add a Corellbraw chart to my report, I can edit it in place the same way. In either case, the menu bar is the only part of the screen that will change as I move from one region to the next. Behind the scenes, there's plenty of extra code driving OLE 2.0, but there's virtually no interface, unlike with the annoying and confusing OLE 1.0.

And that's what the third wave is all about—the perfect interface is really no interface at all.

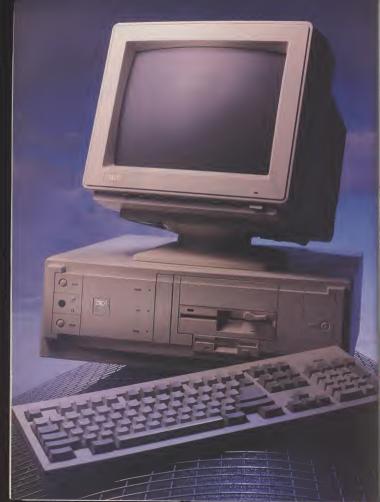
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absolute perfect notebook keyboard. What else?

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Kudos for Guide, Nominees For Hall of Shame Streamlined SuperTip, literas

Streamlined SuperTip, literas classicus, and personal vs. communal computing

Souped Up Windows Guide

Your Windows SuperGuide (November 1992) was better than most of the \$15 to \$20 books found in stores. The Super-Tips were especially valuable. Please consider this type of publication for DOS and other programs, too.

MARK N. GOLDSTEIN

The Windows SuperGuide is outstanding. I bought a second copy and cut it up to make a small manual, which I keep at

my computer.

CHUCK STEWART

Your Windows SuperGuide was comprehensive, but in at least one instance tould have been streamlined. I refer to SuperTip No. 40 detailing how to save Program Manager's settings, without exiting by selecting and deselecting Save Settings on Exit. Too much trouble. Why not just leave the Save Settings on Exit deselected at all times and then merely press Shift while dicking on Exit whenever you wish to save a new arrangement without exiting?

LOU BASSETTI

Kudos, Your Windows SuperGuide is stellar. It transcends—by light-years the cryptic official Microsoft tome. My thoughts on the Windows SuperGuide: locus classicus the authoritative rassage

magnum opus crowning achievement opus magnum spolia optima the choicest spolls summum bonum the highest good

the highest good

HENRY M. CHAPMAN
NATICK, MASSACHUSETTS

Fueling the Frenzy

I disagree with Mr. Dvorak in his November column ("Stop the High-Tech High-Tech Feeding Frenzy! It's a Recipe for Totaltaltarianism," page 88). Of the folks I know who supported Ross Perot, only two out of eight own computers, two more use them occasionally, one always manages to read a book in about a week, and three others read a book in about a week, and three others read more than ticipate in more social activities? One of the big problems these days is human isolation. People are limiting their leisure activities to ones that encompass few, if any, outsiders. Computers, video, and even books aid and abet this desocialization process. People should allocate more time to activities that involve interacting with other people. We're still a social species, are we not?

CHESTER H. JOHNSON



they watch TV. Thus, not all Perot supporters are high-tech freaks bent on change for change's sake and not all of them are aching for the best and latest vy. Similarly, they do not spend all day watching TV or computer screens. Why, Mr. Dvorak, merely stop at suggesting that people read a book as an alternative to watching TV or gazing at a computer screen? Why not advise that they parseren? Why not advise that they parWhile there is some truth in John Dvorak's complaint that America apnears to be in a high-tech feeding frenzy. he doth protest too much. Dyorak is, let's face it, one of PC/Computing's linchnins. The computer industry-even more than the auto industry-persistently presses us with ever-shinier things. Its raison d'être is to sell, There are too many computer-oriented businesses grappling for toeholds, too many computer magazines vying for advertisements, and too many experts like Dvorak whose function is to persuade us to buy. Despite his caviling, Dyorak is like Ross Perot, subtly touting at the same time what he purports to reject. Ever upward and onward is the business of America. I doubt that Dyorak can stop the "horrid trend" and I suspect he wouldn't even if he could. Jobs are hard to come by today-even his.

BERNARD A. DUPONT PUTNAM, CONNECTICUT

Is Dvorak Nuts?

Normally I find John C. Dvorak witty, intense, enlightening, and for the most part correct. In Dvorak vs. Somerson ("Hands Off That Scanner! The Media



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A Rubbermaid Company (

Letters

Police Are on Your Trail," November, page 104), however, he advocated doing away with copyright laws.

Is he nuts? As an engineer, software writer, and photographer, my copyrights are very important to me. I spend a great deal of time developing a product, and my artistic talent is all that senarates me from every other person out there. We already suffer immensely from software piracy, foreign violators. and outright thieves. Copyright laws protect us. Does he really advocate taking them away? What would be my incentive to develop new products if the world could steal them for the cost of a floppy disk? With scanner technology, I agree, it's easy to pick off a bit of an image and use it as you wish. What you need to remember is that this activity is theft! We call it piracy because we don't want to think of ourselves as thieves for making tapes of CDs for our car stereos.

So do we keep the existing laws and update them to protect the artists? Do we enact stronger laws to encourage a fair return for the work involved? Or do we dispose of the laws and give all the art to the thieves? While we're at it, we might as well outlaw door locks, too.

HARLEY BURTON

Examine Penn's Head, Too

I was shocked and disappointed by the taste of your editors for considering that stupid November article by Penn Jillette worthy of publication ("Finally-Neatness Doesn't Count," page 472). To suggest that neatness and striving to be better don't count any longer, that our political parties are nothing more than "scumballs," and that not being able to spell is perfectly acceptable seems ludicrous to me. We have enough problems with the educational system in our country. Printing repulsive articles like this simply adds to them. We need educational help-not diatribes. It's clear that Mr. Jillette grew up deploring educational values. As for me, I'll take Nancy Marcus and all those like her

DONALD S. RITCHIE NORTHPORT, NEW YORK

I'll assume that Penn Jillette's words shouldn't be taken seriously. However, there is a sober aspect to their meaning, which underlies the basic problem we have in this country: failure to take responsibility for oneself.

PAUL A. ELIAS FOUNTAIN HILLS, ARIZONA

Change PC to CC

Regarding Paul Saffo's November column ("The Trend Toward Connectivity Brings the PC Revolution Full Circle. page 92), the world is full of grouchy old men who wish things were the way they used to be. Personally, I'm excited about being able to pull up the public library or get up-to-the-minute weather information on my screen. Moreover, I doubt that "the PC revolution amounted to only a moment of individual independence." Giving up my personalized collection of applications is completely unreasonable and unnecessary. I believe it's possible that the dumb terminal will be available and in wide use by those PC couch potatoes who don't want or need independent computing capabilities—but that won't be the only alternative. Finally, I can imagine a workplace with PCs that were once unconnected turning out information by the heaps. Maximized performance is what the PC world is all about. We may need to change the acronym, though, to CC for community commuter.

WILLIAM M. LEWIS

Dyslectic Virus

One of your "Best of the Rest" virus joke winners (Letters, November 1992, page 26) was the Terry Randall Virus submitted by Marie Oesting. Randall Terry will probably be unset, but that's OK.

RICHARD E. IVES

Nice catch. Sorry we killed your virus,
Ms. Oesting. —Denise Penrose

What business does sound have in a computer?





For starters, you can increase your productivity when you proof spreadsheets with the new Microsoft' Windows' Sound System. Just highlight a series of numbers or words on the screen and it will read them back

to you. It will even read them aloud as you enter them, if you like. To hear more, turn the page.

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-PC/Computing magazine December 1992



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Letters

Nominees for the Usability Hall of Shame

The Usability Hall of Shame was christened in November, 1992, when PC/Computing editor Ed Bott nominated ten prime examples of kludges golfawar and clumsy hardware (page 20). The column that put the spotlight on PC products you love to hate opened a floodgate of responses. Here are excerpts from the original column, and a selection of comeducks from users.

WordPerfect's "No Exit" Key "F7 is Exit? Who dreamed that up?" The world's most popular word processor has a loyal following.

Anyone who'd find WordPerfect's clean use screen "comforting and familiar" would limit a would limit a word with know how to exit WordPerfect property. Anyone with half a brain could look at the keyboard template and see that Exit is F7, or that Help is F3, not F1. Anyone mount of the program property of the program probably couldn't read a user's regulate or reference manual and shouldn't be allowed near a PC.

JIM ROSSOW SOUTH BEND, INDIANA

The Exit key is clearly labeled F7 on the keyboard template that is shipped with each copy of WordPerfect. Since Version 5.1, you can also display a menu bar permanently or call it up by holding the Alt key or clicking the right mouse button.

JOE T. RAWLINS
GROVELAND, MASSACHUSETTS

WordPerfect still belongs in the Hall of Shame, but not for the reason you cited. The company's blunder was in failing to maintain its DOS function-key definitions in the program's Windows version, and releasing that software before it was "ready" to compete with the likes of Ami Pro or Word for Windows.

GARY McCALL BOUNTIFUL, UTAH

RECOVER.EXE "The worst part about this neutron bomb of a DOS utility is that it's so darned easy to use." That's not DOS's only flaw.

I'd vote against RECOVER's nomination. Although it's certainly the most dangerous DOS utility, it bypasses DOS's fileintegrity testing and copies "unreadable" files so that you can regain some (or all) of the data. My nomination: menu-only software. I hate simple programs that make me go through the silly menu. I want utilities that run from the command line.

SCOTT CARNES

Turbo Switches "Why did they put this useless control on the front panel where I can hit it by mistake?"

The turbo switch is hardly useless. When I upgraded to a 486733 motherboard, my color scanner occasionally locked up in the middle of a scan. I finally figured out that my computer's fast speed was responsible. Now I press the turbo switch when scanning to slow the CPU down to IGMHz. I have no more mobilems.

JERRY VAN CLEEF MONTGOMERY, ALABAMA The Misplaced Power Switch "Who decided to put the power switch on the back of the CPU?" People get excited when the seemingly mundane topic of switch and plug placement is raised.

Who cares where the switch is on a PC?
You never use it anyway. You switch the
power on and off with a \$15 power strip.

FREDERICK S. HOLMES, JR.

ANNANDALE VIGINIA

Who put the power switch on the back of the IBM PC? Probably some guy like me with a two-year old daughter who loves to wait until I'm almost done with a file, then runs up and pushes the button.

JOHN ALLAN NORTH STREET, MICHIGAN

The Magnavox 500 386SX's off button is on the front of the machine, next to the A: drive's release button.

L. M. CLARK ARLINGTON, TEXAS

What business does sound have in a computer?



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Letters

Our call for other examples of barely usable software elicited the following:

WordPerfect's Hidden Codes These are probably an ingenious idea, but what a mess when someone can't understand what they are. Some users can end up with a one-page file of more than 50K because they have inserted one of these codes almost everywhere.

BRUNO DESCHENES

Numerical Uncertainty After ten years and five versions of Ms-DOS, I'm still subjected to the message "I FILEGS COPIED." The coneheads at Microsoft are willing to use tens of kilobytes of code for bells and whistles but won't add a few bytes to distinguish between singular and burd.

JAMES PELLEY EUGENE, OREGON

Dangerous Default My all-time Hall of Shame favorite is the DOS FORMAT command, whose default has been to format the hard disk. One undertrained secretary at my office erased all the files from her boss's machine when she was asked to format a floppy.

JANE H. HILL TUCSON, ARIZONA

Automatic Noise The Citizen 200GX printer has a switch for toggling between a quiet mode and a normal mode. If it can print quietly, why not make it always do so? To make matters worse, the default is the noisy mode.

SELIM R. BENBADIS

Keyboard Tangle Plugging the keyboard into the back of the computer requires an extra three feet of cable and gives you one more thing to find while you're standing on your head trying to reconnect a CPIL

JON BOCZKIEWICZ HAWTHORNE, FLORIDA

Manual Labor 1-2-3 One of my pet peeves is that you cannot specify a particular document to open from the command line. This makes it unnecessarily difficult to automate routine tasks.

JOHN M. HOWELLS WRIGHTINGTON, ENGLAND MultiMate Advantage How did you manage to miss this one? From the same folks who brought you the dot prompt comes this would-be word processor. You have to go through about four manuals to look anything up, you can't exps set new defaults, and you can't copy selected text from one document into another.

JANET B. STORY ANN ARBOR, MICHIGAN

PM5-11's Morass of Menus The obscure Property Management System program is weighed down by more than 14 menu screens that you must successsully traverse to accomplish simple tasks such as updating an activity and printing a report. For example, navigating from the data-entry screen to the resourcemanagement screen takes 37 keystrokes and a password.

BILL PETERSON

Ambiguous E's In Sunshine System from Applied Micro Management, the program lets me edit fields when I hit E in one part of the resident database. Elsewhere, E saves changes and exits to the menu. In yet another place, E means I want to lose the changes I've made and start over.

M. TODD CRANDELL

Windows 3.1's Shortcut Removal Aside from the slowness of the Windows version of Xtree in opening and logging a directory tree to the same level of detail, it is no longer possible to hir Shift-letter and move to the next directory entry starting with that letter. Since I have several hundred directories nested five and six deep, I now waste more time paging through the directory structure to find the one I want.

JAMES D. CLOKEY

Microsoft Windows Sound System. You'll be hearing a lot about it.





It's the complete audio solution for your business, with all the hardware and software included. Call (800) 426-9400, Dept. JK8, for a free demo disk that'll bring the Microsoft Windows Sound System to life on your

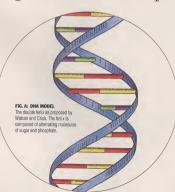
PC. It's the first audio system specifically designed for the Microsoft Windows operating system.

Microsoft Making it easier

Requires the Windows operating system 32 or later. Dono is on a 35-tack high-density disk Offer good while supplies last. Inside the 50 United States, call (2002-045-0400). Deep 18th For information with: In Console, call (8000-050-0400), cutted the United States and Canada, call (2000-050-0600, Co1800). Whereast Corporation will implies represent Francisc in the USA. Macrosoft are applicated transferred health and Windows is a transferred for Corporation.



Click



You've Just ing Witnessed The Power Of FileMaker Pro

Constructing a databas shouldn't require a Ph.D., a libra felo of weighty instruction manuals, you knowledge of some esoteric lat typ guage. It should be an intuitin Sin free-flowing, and dare we say, cative endeavor. Easily undertaked by just about anyone. Whether they've had any prior database properience whatsoever.

To this end, we present FileMaker* Pro for Windows. A sa new database that can organize a your entire department or small business with a click of a mouse. yo

BYTE Magazine says that yellish and powerful applications without the kneed to call in a high-priced in database consultant."

Simply by pointing and click-

Print perfect labels first time, every time. Simply select from one of more than 50 standard Avery sizes.



ing a mouse, you can create a FileMakerPro database with fields for text, numbers, calculations, summaries, dates, times, graphics, even photographs and sounds.

You can size and arrange the fields on your screen in any layout you like. You can assign colors, typefaces, type sizes and typestyles. Simply by pointing and clicking.



Defining fields is as easy as deciding what kind of information you want them to contain, giving them a name and then simply clicking a mouse.

view of what you'll see when you print out that file on paper.

FileMaker Pro is just as easy to automate as it is to use. You can create scripts to automatically per-

form menu

operations,
update files,
run pre-defined
sorts, generate

reports and a whole lot more. Without sitting down and writing a line of programming language.

And the power and flexibility of FileMaker Pro for Windows isn't confined to a single user, a single file or even a single computer.

You can share a FileMakerPro database with everyone in your office across a network of Windows PCs and Macintosh computers. In fact, PC Magazine declared in their press review that FileMakerPro for Windows sets "the standard in cross-platform compatibility." Of course, we realize you didn't just go into business yesterday. So we made sure you can import your old data from Q&A, Paradox, dBASE, 1-2-3, Excel and a host of other applications.

Call, fax or mail the coupon and we'll send you a free video that will show you just how easy it is to build a Windows database.



Personal Computer Magazine said in their review that setting up a database "couldn't be simpler."

Every FileMaker Pro file gives you as many views or layouts of your information as you may need to get your job done.

So you can easily create all kinds of customized forms, reports, invoices, catalogs, directories, mailing labels and form letters from just one FileMaker Pro file.

Unlike most other databases, the way you see a FileMaker Profile on the screen is an exact pre-



New!

Your whole Windows utilities wish list . . .

PC Tools for Windows: The Ultimate Desktop

PC TOOLS FOR WINDOWS, PRICE NOT SET AT PRESS TIME CENTRAL POINT SOFTWARE 15220 NW GREENBRIER PKWY, SUITE 200 BEAVERTON, OR 97006 (503) 6908090

WHO NEEDS MACS? Centrol Point Software's new PC Tools for Windows looks and feels like Apple's Mocintash, Falder icons represent the program group boxes found in Windows' Program Monager (see below). The dotobase running beneath PC Tools for Windows will let future enhoncements add powerful functionality the wov that the datahase beneath HP's New-Wave does

THINK OF THE new Windows version of PC Tools as a better Norton Desktop than Norton Desktop for Windows 2.0, and you've got the picture. Central Point Software's PC Tools for Windows is every bit the Windows desktop and general Windows utility package that NDW 2.0 is—and then some. Look out. Symanter.

Norton Desktop users will have no trouble grasping PC Tools for Windows, Although the two Windows Program Manager replacements have different feature sets, their basic metaphors are nearly identical, Like NDW, PC Tools for Windows lets you place icons on its desktop for launching applications. It also automatically imports Windows Program Manager groups and can nest program group boxes within group boxes. The greatly improved File Manager sports an excellent file viewer, and there's a host of drag-and-drop tool icons for printing, disk formatting, program scheduling, icon editing, file searching, screen capturing, and many other functions. Also, Central Point has followed Symantec's lead by including several useful Windows versions of its popular DOS utilities, including DiskFix, Backup, AntiVirus, and Undelete, Expected to have a list price in the range of PC Tools for

DOS-\$179-PC Tools for Windows should be a helluva hargain

But the new PC Tools' hands-down best feature is something you can't get from NDW an integrated virtual-mapping facility called MultiDesk, With MultiDesk, you create and store multiple desktops, then retrieve them with a single mouse click. So, for example, if you manage your budgeting with Excel, a terminal emulator, a calculator, and a set of specific data files, you can place icons for them all in one desktop and call it Budgets.

To manage multiple desktops, PC Tools for Windows provides the Desktop Manager—a scalable structure that displays desktop thumbnails. To switch between desktops, you click the title bear of a humbnail. You can also rearrange the contents of desktops from the Desktop Manager. Central Point even lets you build, save, and recall sets of desktops it calls Offices. And since PC Tools for Windows offers excellent network support for Novell NetWare 3.2 and Microsoft's Windows for Workgroups 3.1, you can build sets of desktops customized to specific projects and disseminate them to employees across your network.

Virtual-mapping utilities tend to sap system resources, since they generally hold screen-virtualized applications in memory along with the programs currently in use. This is true of MultiDesk, too, but Central Point offers a nifty solution. When you move back and forth between desktops, they re all held in memory. As you switch from one desktop to another, the desktop chaps almost instantaneously. If you know you won't be using a desktop on a particular day, you can close it down—thereby closing the applications it contains—to save memory. When you open a desktop gain, it automatically reloads the applications and repositions the windows exactly as you left them.

PC Tools for Windows' second-best feature is its file manager, which combines much of the power of XTree's XTree for Windows with the look and feel of Windows 3.1's File Manager. The file manager offers integrated ZIP-





DeskTop

compatible automatic file compression. You can drag and drop files to compress and decompress them on the fly. And while XTree would require you to mount ZIP files as drives, PC Tools' file manager makes them automatically available in whatever directory vou created them.

Castomizability has always been a strong suit of Norton Desktipp, but PC Tools for Windows is much more customizable than NDW. Like NDW, PC Tools for Windows offers customizable memus, button bars, and hotkey functions. But unlike NDW, this flexibility is available for the desktop, the file manager, and every standalou utility. In addition to having a powerful macro language and dialog editor, PC Tools for Windows lets you create enstome commands that can be added to memus or substituted for existing commands.

You can also make quick changes to the appearance of PC Tools for Windows. Like Norton Desktop for Windows, the new PC Tools lets you set properties for icons, but PC Tools offers broader support for program-window sizes and locations. For example, you can select Icons from the Icon Properties dialog box for a selection of Icons—you don't have to hunt down an icon-library file. In fact, most of PC Tools for Windows' functions are just a right mouse Click away.

Beneath the surface, PC Tools for Windows has another important advantage over Norton Desktop. Like Hewlett-Packard's New Wave, PC Tools for Windows is designed around a database that keeps track of files, icons, folders, and desktops; enables functions like sharable Offices; and offers extensive security fea-

tures. One advanced database option, for example, deletes associated programs and data files in one fell swoop when you delete a program icon. The database provides a good platform for potential new features in future versions of PC Tools. This function is likely to show up in the next generation of Microsoft Windows.

What's Not to Like?

With all that PC Tools for Windows has going for it, you shouldn't be surprised that we found a few problems. Central Point hadn't begun ontimizing the product for speed when we tested an early prerelease version, and it was much slower than we would have liked. Ask for a test run before you buy. Another criticism is that while the configurable toolbars are an excellent addition, the buttons themselves are so large that it's difficult to fit many onscreenespecially at 640 by 480 pixels. And while having many functions available from the right mouse button is a great idea, it's easy to forget useful options. This may be a blessing in disquise, however-one of the program's strengths is that it's less daunting than NDW for first-time users. We spent substantially less time configuring than we have during Norton Desktop installations.

In terms of features, usability, and attention to detail, PC Tools for Windows represents the best 1.0 release of a Windows program we've seen in quite a long time. For the first time, those who use Norton Desktop for Windows could very well begin to feel pangs of envy.

SCOT FINNIE



Backu





File Manager



File Viewe



Undelete

What You Get—and Don't Get—in DOS and Windows Versions of PC Tools

Features Unique to PC Tools 8.0 for DOS

- ✓ RAMBoost, a memary aptimizer
 ✓ DriveMap remate drive mapping
- ✓ Cammute remate cantral
- ✓ Desktop accessories: Notepad, a database address book, a calculator, modern telecommunications, fax capabilities,
- an appointment scheduler, an outliner
- ✓ FileFix file repair
- ✓ PC-Cache
 ✓ Directory Lock
- ✓ Directory Lo.

Features Unique to PC Tools for Windows

- / MultiDesk virtual desktops
- ✓ Netwark sharable desktops
- ✓ Full-featured Windaws File Manager
- Support for Windaws for Warkgroups, drive sharing, and e-mail
- ✓ Object linking and embedding support
- ✓ Dialog editor
- √ Ican editor
- ✓ Screen capture



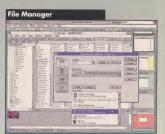
PC Tools for Windows: Better Desktop And File Management, Plus Cool Tools



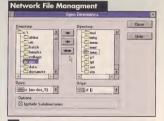
MultiDesk is PC Tools' built-in virtual screen for desktops. The Desktop Monoger gives you o thumbnoil view of the desktops you create. By dosing a desktop—the Presentations desktop above is closed—you retain its configuration and reduce drow on system resources.



Like Norton Desktop's Drive Window, the PC Tools for Windows file monoger hos a file viewer that supports 80 file formots. A slick twist: You can tear off a copy of a viewed image, crop it, and drog it around your screen.



The file monoger that comes with PC Tools for Windows works much like Windows' File Manager, but it adds several powerful features. You can austomize the button bor, menus, keyboard, and commands in one well-thought-out diolog box that describes all the available commands.



One of the best file-monogement feotures PC Tools for Windows offers is Sync Directories, o powerful LopLink Pro-like function that lets you copy all files from one subdirectory or bronch to another in one or both directions outomatically—either locally or across the network.

DiskFix Under Windows



PC Tools for Windows' version of DiskFix is o Windows opplication that outomates the analysis and repair of hard drive problems from Windows, Linked with the PC Tools for Windows program scheduler, it could toke the surprise out of disk problems and prevent disasters as well.

Uninstall Uningtall: Module Selecti Select the modules you would like to uninstall. The disk space savings is listed by each module. Previous Anti-Virus TSR's Select All Virus crotection and d 301 KE Unselect All Floppy Only Backup 420 KB Exit Backup to floopy disk or CSI Tape Only Backs Disk space required by modules 6030 KB 155 MB Used 70 MB Free

Z Centrol Point thoughtfully provides o folder combining Schup, Configure, and Uninstall icons. The uninstall process lets you remove ports or all of the program, returning your Windows installation to its original configuration. A full installation of PC Tools for Windows takes up about 12.5MB of disk space; a bosic or laptop installation takes up only 5MB.

76 MB Free

Installable Control Panel



Why does Centrol Point give you its own version of something you olready hove—a control ponel? PC Tools' version of the Windows Control Ponel is more flexible. You can odd or remove icons from it and place them onywhere else just by dragging and drapping them.

Tools and Accessories



B NDW's drag-ond-drop tools are one of its advantages, and Central Point has token notice. The prerelease version of PC Tools for Windows that we tested comes with 28 tool kans for standalone utilities and file-monager functions that make icon-based desktop computing a snop. At press time, Central Point was considering adding even more of these tools.

149 MB Uzed

FRTIBLE. CONV

Introducing the new GR, LD-Convertible, the notebook computer that redefines convenience by setting new standards for mobility. With its top down, the Convertible functions as a mobile pen tablet, able to be used even when space is at a premium. Unlike traditional keyboard-based nortebooks, the Convertible uses a pen for data input and pen-based applications. In fact, the Convertible



WITH THE TOP DOWN.

Flip the top, and the Convertible becomes a notebook with a 9.5-inch screen and full-sized keyboard. With the top up, you can run traditional keyboard-based MS-IDOS" programs, and enter data as you would on a regular notebook computer. The Convertible comes with a 125 megabyte hard drive, an Intel386° SI. microprocessor, a math coprocessor and sufficient RAM to run even the most powerful applications. And "is hurstled with MS-IDOS 5.0"



and Microsoft® Windows for Pen," and a version of the PenCell® spreadsheet program. Yet its sleek design and light weight offers unsurpassed mobility.

Test drive the new GRID Convertible today, with the top down and the top up. For details on where to purchase this revolutionary new computer, or the name of the GRID sales representative near you, call GRID On-Line Express today at 1.800.934 GRID

WITH THE TOP UP.

GRID







Circle 173 on reader service card.

AST's Brilliant Color Display: Only IBM's ThinkPad Competes

PORTABLE COLOR,

Can't affard AST's calar system (see right)? PC Brand's (800-722-7263)

V



486/SLC LeaderBaak, a 5.7-paund machine pawered by Cyrix's 25MHz 4865LC, cames with a crisp, 8.5-inch (diaganal) passive-matrix display and casts a mere \$2,595.

The LeaderBank displays 256 calars at 640by-480 resalution and features a clumsy rightmounted trackball with buttans on the side of the natebaak. The system performed better than ather 386s in pracessing and videa chares, but nat at disk-intensive aperatians. Still, with an 80MB hard drive and 2MB af RAM (yau'll want 4MB), the LeaderBack makes calar an the raad cheap. MARTY IFROME AST HAS JUST raised the stakes for state-ofthe-art portable computing. The company's PowerExec 425E L ColorPhs notebook edges out Company's splendid LTE Lite 425c in features and ergonomics—no small feat. The PowerExec now finds itself in the company of IBM's venerated ThinkPail 700C as one of the two best notebooks money can buy.

Powered by Intel's battery-saving 3.3-wit 25MH-48SL CPU, be Power-Exec comes with a beautiful 9.5-inch active-matrix color display capable of showing 256 richly saturated colors at 640-by-480-bjet resolution. Bright and lovely, it is i inch larger diagonally than the Compaq's display. You can buy the PowerExec in monochrome and passive-matrix versions as well, then upgrade to the active-matrix display later if you like.

Upgradability extends across almost all of the notebook's components. The hard drive, for example, is removable (and comes in capacities of 60MB, 80MB, 120MB, 160MB, and 200MB).

AST already offers a \$99 drivebay adapter for shuttling a hard disk between a notebook and a desktop PC. The PowerExec comes standard with flash BIOS as well as two Type II PCMCIA solts, which allow you to use the growing east of PCMCIA modems, faxes, network cards, SCSI adapters, and hard drives from manufacturers of your own choosing.

Traveling with the machine is made as painless as possible. Measuring a standard 8.5 by 11 by 2 linches, the PowerExce weights 6.9 pounds—the same weight as the Compaq Lite 4/25c and more than a half-pound lighter than the IBM ThinkPad 700C. A surprisingly small recharger tucks unobtrusively into the notebook's carrying case and recharges the nickel-metal hydride battery in an hour flat. In a pinch, you can even run the note-book off 12 AA batteries.

The keyboard on the PowerExec is remarkably similar to the Compaq LTE/Lite series keyboard in response and field, keyb nave a short, stiff travel. Layout and spacing is good, although a few keys are oddly placed. Half-size End and Page Up keys reside on the top function-key row, for example, while the Page Down key below them is full size. And we'd happily trade the Ins and Del keys to the right of the space has for second did and Ctrl keys.

Recognizing that most built-in pointing deviese on portable PCs are dreadful, AST decided to offer an optional cableless trackhall (850) that connects to a "hot shoe"—an adapter—on the front of the notebook. Windows will recognize the device even if you connect it after the GUI is loaded in memory. Designed by a consortium of manufacturers, hot shoes now appear on other notebooks, as well,

The PowerExec is a solid performer, running neck and neck with Compaq's LTE Lit-4225c in processing and memory chores. The Compaq performed better in video tests, although the AST was far faster in video than the vast majority of (continued on page 46)



AST's PawerExec 4/25SL CalarPlus natebaak has great features and erganamics: It has a gargeous active-matrix calar display, weights anly 6.9 paunds, and measures 8.5 by 11 by 2 inches. The PawerExec has a slightly smaller screen than IBM's ThinkPad 700C and perfarmed nearly as fast as Campaq's LTE Lite 4/25c.

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Circle 118 on reader service card.



FROM ASCII TO LOTUS 1-2-3

At last, there's o dependoble way to bring ony ASCII file into a 1-2-3composible spreadsheet without getting a file full of unformatted gorbage: Use Trons Plus, from Intex Solutions (617-449-6222).

This \$225 68K DOS TSR recognizes potterns in your ASCII files ond formats them in spreadsheet rows and columns. Specifically, the program looks for columnor notterns in your file, then translates them without requiring ony special delimiters, such as commas. If you keep dota in o word processor and you'd like to get it into o spreadsheet such as Lotus 1-2-3 or compotible products. Trons Plus will save you from doing a lot of reformotting.

We tried Trons Plus with o few different spreadsheets and ASCII files, and we got the best results working with ASCII files made up of foirly structured columnor data. If your ASCII files ore a disorganized mess with no columnor structure to speak of, you'll still have to do some formotting. The program runs well with oll versions of 1-2-3, Symphony, Quattro Pro, and Excel. SERASTIAN RUPLEY AST NOTEBOOK, from page 44
machines on the market. The PowerExec
held 2 hours and 21 minutes of battery charge
in our run-down tests with all of its powermanagement features turned off, which is better than even most monochrome 486-hased

notebooks can manage.

AST outfitted the notebook with an unusual power-management utility that monitors your work patterns, and then adjusts sleep mode, hard drive spin-downs, and backlighting shut-offs accordingly. As with the IBM and Compan, you can swap batteries on the AST by invoking Suspend mode, which gives you up to 90 minutes before data is lost.

While heaping attention on the travails of travel, AST didn't neglect the growing number of people who use their notebooks as their sole machine. The company offers a full-fledged docking station, with two 16-bit ISA slots and one drive bay, for \$449, as well as a \$99 port replicator that lets you hook up your desktop monitor, AC adapter, printer, and other cables with a single connection.

Do these extras make the PowerExec the best notebook you can buy? IBM's ThinkPad 700C provides a larger display, a usable builtin pointing device, and an upgradable CPU, in addition to a removable hard disk and flash BIOS. On the other hand, the ThinkPad weighs more and lacks the floating-point capabilities of the 486SL chip. They're both the best you can but her MART HEROM.

AST POWEREXEC 4/25SL COLORPLUS, \$4,495 AST RESEARCH; 16215 ALTON PKWY., P.O. BOX 19658 IRVINE, CA 92713-9658; [800] 876-4278, [714] 727-4147

Logitech's AudioMan Offers a Cheaper Sound Solution—And It Sits on Your Desk

AUDIOMAN, \$17V HOGITECH 505 KAISER DR. FREMONT, CA 94555 (800) 231-7717 (510) 795-8500 LOGITECH WANTS business to get serious about sound. AudioMan, the company's sculpted new "audio tool," provides

one of the most hasslefree ways for Windows users to annotate docu-

ments, spreadsheets, and graphics with sound. The \$170 device connects to a standard parallel port and includes a pass-through connector. It runs off two standard AA batteries or at AC adapter and includes an output jack for attacking headphones, external speakers, or other devices, and an input jack for

attaching, say, a CD player.

Installation is a breeze. Software comes on a single disk that you install through either the Windows Control Panel or Program Manager (it uses 410K of hard disk space). Users who have game or MPC sound cards already installed as a secondary audio device can install Audio Man.

AudioMan's dialog box is invoked through the Windows Control Panel. It allows you to set volume (there are also manual volume controls on the unit itself) and monitors the charge in your AA batteries.

Any application that supports Windows' object linking and embedding can incorporate sound with AudioMan and a few mouse clicks. Say, for example, that while auditing a worksheet in Excel 4.0 you want to insert a voice annotation by a total that looks inaccurate. Place the cursor in the cell next to the total, and select Edit, Insert, Object, Sound to call up Windows' Sound Recorder. Then click on the Record button and begin speaking.

AudioMan's microphone sits on top of its 2-inch concave speaker. Though Sound Recorder limits each "tape" to 60 seconds of sound, AudioMan can play tapes consecutively. But don't get carried (continued on page 59)



Logitech's AudioMon records voice and other sounds os Windows WAV files and lets you embed them in word processing documents, spreodsheets, and grophics.

"Is it true that Irwin EzPort minicartridge tape systems simply plug in to the parallel port of everything from desktop to notebook PCs?"

"Yes."

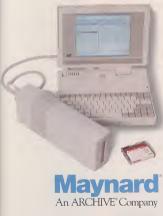
"And only EzPort tape backup software has an easy-to-use GUI DOS interface?"

"Yes."

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honored us with two World Class Awards in 1992 - one for the Gateway 4DX-33 and another for Service and

Our hats are off to Compute magazine for presenting us with 1992 Best Desktop Computer for the Gateway

We're thrilled that Popular Science magazine recognized the Gateway HandBook portable PC as one of 1992's "Best of What's New."

And thank you BYTE magazine for an Award of Distinction for the HandBook. BYTE readers also chose the Gateway 486DX as Desktop Computer of the Year.

Finally, we applaud all our loyal customers. Without your unwavering support throughout the years, Gateway couldn't have won these honors. We owe our success to you, and we'll be forever grateful. Here's to another great year in 1993!



What Do You Wish For In A PC?



GATEWAY2000

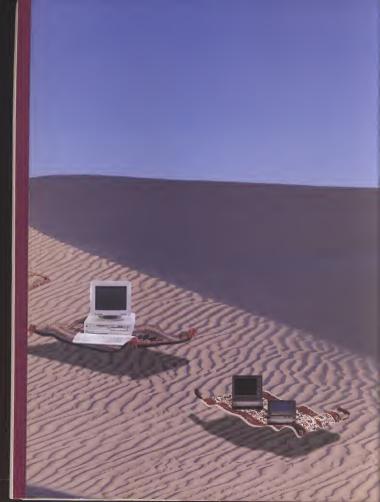
"I wish I could get a great PC at a great price without sacrificing performance and features."

"I wish I could be sure I'm buying from a PC company that will provide excellent service and support – a company that will be around for me."

"I Wish I could find the combination of features I need in a portable PC - at the right price."

Your Wish Is Our Command!





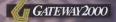
Your wish

is our command at

Gateway 2000! We can grant you the three most universal PC wishes in the wink of an eye. As a fringe benefit, we won't limit you to three wishes here. Most anything your heart desires in computers (sorry, we can't grant wishes for romance or riches), you can get from Gateway.

That's because we built our business by listening to our customers' wishes and doing everything in our power to make their dreams come true. At Gateway, we believe you should be able to have it all: the latest technology, glittering performance, quality construction, enchanting service and the fairest prices in the land. All this from a financially healthy company that won't run dry and leave you stranded in the desert.

You don't have to settle for less. With Gateway 2000, you can have it all. Draw up your wish list and give us a call. We'll make some truly magical values materialize for you.



Gateway Grants You The Most Wone

"I wish I could get a great PC at a great price without sacrificing performance and features." Your wish is our command!

You'll be spellbound by Gateway's ferociously competitive prices on systems



that are unequaled in powerful performance, impressive features and graceful integration of components. Other companies make the same claims, but the truth is revealed when readers and editors of the most popular PC magazines are asked which company delivers on its promises. Their overwhelming response is Gateway 2000.



"Gateway has gone far beyond conventional ideas of

price and performance. In doing so, it has created new rules that other PC makers will have to follow if they want to remain players."

- PC Computing, 1992 MVP Awards

"Gateway 2000 was the big 1992 Best Buy winner, sweeping not only the desktop awards as it did last year, but the newly expanded notebook categories as well ... Altogether, Gateway won five Best Buy awards this year, including Best Overall System Vendor ... It's no surprise that Gateway is consistently the people's choice when it comes to systems. Its formula for success is to sell fully configured PCs at aggressive, how-can-they-do-that prices, along with comprehensive service and technical support."

- Computer Shopper, 1992 Readers' Best Buy Awards

ous Value In The Land.

"Gateway not only captured the title for best desktop, it also got the nod for best service and support and ranked in the top five for portables, notebooks, most promising newcomer and best mail-order firm."

- PC World, 1992 Readers' Choice Awards

"I wish I could be sure I'm buying from a PC company that will provide excellent service and support – a company that will be around for me." Your wish is our command!

Twice in 1992, Gateway was honored for outstanding service. PC World readers ranked Gateway number one in service and support. And PC Magazine readers gave Gateway the best overall scores in the 1992 Service and Reliability Survey.

Just as important is our strength as a company. Warranties and assurances of lifetime technical support don't mean anything unless a company survives to bonor them, which is a serious consideration in the shifting sands of today's PC marketplace.

Gateway is among the few financially robust companies in the industry. Our 1992 revenues exceeded \$1 billion and our earnings are among the strongest in the industry.

The company is virtually debt-free. At a time when other companies have been forced to lay off employees, we added 300 people to our staff. You now have 1,800 friends in the business. Rest assured Gateway is your oasis that will never leave you high and dry. We'll be here for you!



60 0 - 5 2 3 - 2 0 0 0

For The Nomad In You.

"I wish I could find the combination of features I need in a portable PC - at the right price." Your wish is our command!

No matter what you need in a portable, you'll find it in one of our Nomad models or



in the Gateway HandBook.™ Gateway
customers selected Nomads as the winners
in 386 and 486 notebook categories of
Computer Shapper's 1992 Best Buy
Awards.

"There are faster laptops, there are cheaper laptops, there are color laptops, but there is no better laptop ... Weighing in at only 5.6 pounds, the Nomad combines the powerful punch of a 25MHz i486DX with a working battery life of more than six hours. At lone last, we have a lanton

that can really go the distance when there's no power outlet in sight."

- Computer Shopper, 1992 Readers' Best Buy Awards

The Gateway 2000 HandBook is an enchanting, one-of-a-kind, real PC in miniature form! The HandBook, recognized by *Popular Science* magazine as one of the "Best of What's New" products of 1992, also received *BYTE* magazine's Award of Distinction.

PC Computing describes the HandBook as "an engineering marvel." PC Week agrees.
"Gateway's HandBook is just about as small as a fully functional portable can be.
Because the HandBook is powerful enough for most of my needs and fits comfortably in my briefcase, I now leave the computer bag at home."



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VESA Local Bus

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- Choice of Application Software \$2495

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 $\begin{array}{l} \textbf{AUDIOMAN, } from \ page \ 46 \\ \text{away: A 60-second sound object ballooned a} \\ 43 \text{K WinWord document to } 693 \text{K in our tests.} \end{array}$

AudioMan stores objects as standard Windows WAV files—an analog format—which is why they gobble so much hard disk space. Still, in 60 seconds most people could read aloud at least half of this review.

AudioMan records in sample rates of 8 bits (mono) at 11KHz and plays back at sample rates of 8 bits at 22KHz. By comparison, the Microsoft Windows Sound System (see New!, November 1992, page 36) is fully MPC compatible and capable of 16-bit (stereo) sample sizes at 44 1KHz.

Unfortunately, Microsoft's solution costs \$110 more than Logitech's AudioMan. For adding simple voice objects to business documents, AudioMan offers a simpler and cheaper solution.

SIMPLE SERVER SCHEDULING

Heads up, memary misers. NetWare servers everywhere are pressed far mare efficient use of memary. If yours is like mast, yau've gat Net-Ware landable madules (NLMs) laadina indiscriminately, sa every pragram haas valuable server cache memary all the time. Even if vau're well stocked with memary. yau're prabably suffering a performance hit. The cure: NetWare Cansale Commander fram Frve Camputer Systems (617-451-5400).

Frve's product lets you schedule NetWare 3.1 Plus cammands to take place autamatically. The S395 DOS pragram has a simple calendar interface, sa yau can schedule autamated events, induding recurring events, with paint-and-dick ease. This pragram can be an incredible time-saver for LAN administrators. To control NLM aperation, for example, simply specify a date, the name of your server, the cammands. and the times. The praaram alsa can autamatically schedule ather netwark events, such as backups. And af caurse vau can autamate the pracess of adding or remaving applications for vaur awn use.

SEBASTIAN RUPLEY

Clock-Doubled Local-Bus 66MHz PCs Sail Through Windows Speed Tests

IF YOU THINK 66MHz 486 PCs are fast, you won't believe how they fly when they've got a local-bus graphics adapter inside.

We evaluated three such machines and came to this stunning conclusion: Adding a graphics adapter to the local bus on a 66MHz PC can speed Windows applications by 50 percent.

This dramatic performance improvement is due to the fact that the local-bus graphics card plugs directly into the CPU bus. That allows the card to run at nearly CPU speed (nearly 33MHz on a 66MHz DXZ machine) instead of the 8MHz speed at which pormal LO bus cards sure

We chose three local-bus designs and configurations. Artic Design's Windows Power Station 486DX2-66VLB offers a local-bus PC based on the Video Electronics Standards. Association's VL-Bus standard; Hewlett Packard's 486/60 Uffers a proprietary local-bus graphics design; and Sirius Systems SST 486DX2-66LC offers a local-bus system based on the Outload-bus elesion.

Ariel Design Windows Power Station

Our favorite of the three systems is Ariel Design's Windows Power Station 486DX2-66VLB. (It's also called the OS/2 Power Station, if you decide to outfit it with OS/2 2.0 instead of Windows.) It offers blazing performance at an outstanding price.

For \$4,295 you get a walloping configuration, including a tower-style chassis with eight drive bays, a 520MB Fujitsu drive, 8MB of RAM with a 256K processor cache, a flash-memory BIOS for easy BIOS upgrading, a

NEC 15-inch flat-screen monitor, and a Keytronics keyboard. Better yet, the machine offers two local-bus adapters for the system's two VL-Bus sockets—a custom version of ATI's Ultra Pro graphics accelerator (Mach 32-based) and Ultrastore's 34F VLB SCSI controller.

controller.

And what performance! The Power Station we evaluated was the second-fastest 66MHz local-bus system we've ever tested. It completed our graphics and disk-intensive Word for Windows macro in just 91 seconds (another 66MHz local-bus PC earned the fastest score ever, 88 seconds). That's significantly faster than the 135 seconds it took the typical 66MHz non-local-bus PC. The (continued on page 60) mon-local-bus PC. The (continued on page 60)



Far blazing Windaws perfarmance, dack-daubled 66MHz 486 systems like these fram Ariel Design (left), Sirius Systems (center), and Hewlett-Packard (right) can't be beat.

HIGH RES HP LASER PRINTING

Hewlett-Packard's Laser-Jet 4 upped the resolution ante ta 600 dats per inch, but LaserMaster's (800-365-4646) \$995 WinJet 1200 turns the LaserJet 4 inta a 1,200-dpi Past-Script-compatible printer.

It includes a video cable and boards far the printer and camputer and a PostScript interpreter, Windows Direct Driver, and 50 TrueType fants.

With the Windet 1200, rasterization accurs in the PC, but in the backgraund. And the included Laser-Master's WinPrint Manager runs under NetWare 3.11 ar Windows far Workgraups.

WinJet 1200 alsa supports standard PCL printing, and the Windows Direct Driver provides superfast printing fram Windows apps; hawever, both mades are limited to the LaserJet 4's native 600 dpi.

You need a 386DX or better with at least 16MB of RAM. CYNDY BATES 486/66 PCs, from page 59 Power Station also completed our Excel macro in 13 seconds, the fastest score we've seen. A typical 66MHz system takes well over 30 seconds to complete the test.

Ariel may not be the best-known computer company in the world, but it offers a big-name software bundle and a great warranty package. You get your choice of DOS 5.0 and Windows 3.1, or OS/2.2.0. If you choose the Windows bundle, you get your choice of three popular Borland applications: Quattro Pro. Paradox 4.0, or C++.

HP Vectra 486/66U PC Model 240

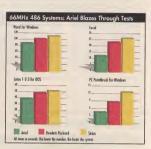
This \$3,659 Vectra was no performance slouch. The configuration we tested was a full-size desktop PC with a proprietary local-bus design. Based on an S3 Windows accelerator chip with 1MB of video RAM onboard, it displays 256 colors at up to 1,024-by-768 resolution. The system also includes 8MB of system memory.

The HP system, with its proprietary local bus, wasn't as fast as the VL-Bus systems we tested, but it was still faster than non-local-bus PCs. The HP completed our Excel and Win-Word macros in 24 seconds and 105 seconds, respectively, compared to the 33 and 135-second average times a non-local-bus system achieves. A faster hard disk would have significantly improved these results. Our tests showed the HP 240MB internal IDE hard disk to be a fairly sluggish disk no matter how you slice it.

The crowning glory of this system isn't so much its performance as its easy-to-upgrade design. The hard disk and floppy drives are easy to swap out and replace, and the CPU is in a zero-insertion force (ZIF) socket. Because

> the motherboard lets you switch between 25MHz and 33MHz clock speeds, that ZIF socket will accept either a 25MHz or 33MHz 486SX or DX, or a clock-doubling DX2 running at 50MHz or 66MHz.

Other nice touches include a Flashmemory B1OS for easy upgrading, a full set of Windows and AutoCAD drivers, and a number of security features: a front-panel push-button lock for the keyboard and mouse, and disk and serialport locks. The machine also has a snapoff cover.



SST 486DX2-66LC

Before VL-Bus, there was Opti. The Opti localbus design was the closest thing the PC industry had to a local-bus standard before the vendors in VESA decided on VL-Bus.

So is Opti passe? Not in our opinion. The Strius system proves what we suspected all along: PCs based on Opti local bus may not be as fast as current local-bus systems, but they're great bargains. SST's system, priced at just 42,900, includes a minitower chassis, five ISA slots, a proprietary S3-based local-bus graphics card with 1MB of RAM, and an empty opti local-bus slot for Sirius's planned SCSI offering.

The system also includes a fast Western Digital 120MB Caviar IDE drive, a 15-inch CTX monitor, a Keytronies keyboard, and an IDE card that lets you attach up to two hard disks and four floppy drives. (Typically, IDE comes on the motherboard and allows just two of each drive type.)

The system we tested, which included 8MB of RAM and a 256K cache, was slower than HP's solution, but not unacceptably so. Its hard disk, however, blew the others away.

At this writing, SST was on the verge of releasing a more expensive EISA version of this system, as well as other systems based on the VL-Bus local-bus standard.

GINA SMITH

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IF YOUR PRINTING sessions have turned into coffee breaks, consider Microsoft's new Windows Printing System (WPS).

For \$199, this hardware/software combo slashes printing time and boosts your control over the process.

The Windows Printing System includes a hardware cartridge that installs like a regular font cartridge in your printer and a software driver that behaves like a regular Windows printer driver. (Currently supported printers are Hewlett-Packard LaserJet models II, IID, IIP, IIP Plus, III, IIID, and IIIP.) Because the cartridge allows the printer to talk to the PC-a first-the computer can display useful feedback about the status of the print job and error messages. The WPS is compatible with DOS and will automatically switch to PCL emulation if you exit to DOS or load a DOS session from Windows, Although you won't gain any speed advantage with DOS applications, you won't have to manually change settings every time you switch between Windows and DOS.

The WPS prints quickly because it uses the native Windows GDI imaging model to avoid having to translate the image into HP's native PCL format. In addition, sophisticated algorithms balance the load between the host computer and the printer, keeping the printer running at close to rated speed.

How fast is it? Plenty. In our tests, a tenpage Word for Windows document containing several bitmaps and multiple fonts took 3 min-

utes and 4 seconds to print without the WPS, but only 1 minute and 51 seconds with WPS installed. Similarly, a tenslide, graphics-laden Freelance Graphics presentation shot out of the printer in 2 minutes and 3 seconds with WPS, but poked along at 11 minutes and 47 seconds without it.

Installation takes about ten minutes. Just turn off the printer and insert the



Printing on both sides of the poper under Windows is easy with the Micrasoft Windows Printing System.

eartridge into the printer's eartridge slot (the left slot if your printer has two), then turn on your printer and let it warm up while you install the software. The WPS takes up about 82MB of disk space if you perform the full (Express) installation that includes 79 True-Type fonts (30 typeface families including headline, decorative, and body copy faces) and works with True/Type fonts from other vendors. You can also load just the basic Windows Printing System, in which case you'll need approximately 1.9MB of disk space. Microsoft has designed the product so that even a 512K LaserJet can print full-page graphics.

The WPS printer driver offers some nitly features. When you print a test page, a voice announces "printing started," followed by "printing complete" when the job is done. And you can automatically print on both sides of the paper. The Windows Printing System first prints the odd-numbered pages, prompts you to refinest the paper, then prints the even-numbered pages on the back.

If your work requires won to print a let of If your work requires won to print a let of If your work requires won to print a let of

documents, especially graphics-intensive presentations, the Windows Printing System is a must. At \$199, it's an inexpensive solution to some long-standing problems.



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MICROSOFT VIDEO FOR WINDOWS, \$199 REDMOND, WA 98052

MTV AND THE PC just collided, Microsoft's Video for Windows digital-video software puts full-motion video within reach of every Windows

user-for under \$200. Designed for professional desktop film editors, video amateurs, and anyone interested in business video for the PC. Video for Windows lets you edit, play back, and even capture full-motion video clips. You can drop these clips into other Windows applications and watch presentations, Win-

dows documents, and even e-mail messages come to life.

If you've ever used a VCR, you'll have no trouble with Video for Windows. It plays back video using an updated version of Windows' Media Player and uses a VCR-style metaphor for playing, stopping, and controlling video, Because it supports object linking and embedding. you can embed clips in spreadsheets. word processing documents, and Windows applications that support OLE. Tap out a document on your word processor, choose Insert, Object from your application's menus, and insert a videoclip icon in your document, just as you would a graphical image or chart.

To view the inserted video clip. double-click on the video icon, and Video for Windows pops up within your application. The license you get with Video for Windows allows you to distribute the new version of Media Player to others so that they can view your video creations as well.

So where do you get the video clips? To start vou out. Microsoft includes a video-clip library of more than 250 sample digital files on a CD-ROM disc (including a priceless short of Bill Gates saving, "Cool!"), A video browser allows you to preview and sort through the clips. As desktop video catches on, CD-ROM discs with video clips from Microsoft and other companies are likely to turn up on software dealer's

If you don't want to rely on canned video. you can capture your own footage with a videocapture board such as SuperMac's \$495 Video-Spigot for Windows (see the review on page 68). Video for Windows' VidCap handles the software side of the capture, letting you record fullmotion video from a videotane, videodisc, or video camera and save it to your hard drive or other storage device. With a sound card and microphone, you can record sound to play back with the video as well. Microsoft Video for Windows includes a converter for porting movies created on the Mac with Apple's QuickTime to Windows.

For sophisticated image editing, Video for Windows includes BitEdit, which imports and



Micrasaft Videa far Windaws lets you play back videa dips such as the ane shown here of Bill Gates.

enhances scanned and captured images, and PalEdit, which edits the color palette associated with a bit-mapped image or audio/video sequence. For adding sound to your videos, Wave-Edit lets you edit sound files and create basic sound effects.

Until now, digital video on the PC has been mired in an alphabet soup of standards. Microsoft's Video for Windows however, promises to bring some clarity to the video standards confusion. All of the files that it creates are stored in the AVI (Audio Video Interleave) format. Because AVI doesn't make heavy demands on a PC's CPU, even a 386SX/16 (the minimum requirement for a multimedia PC) can play back video clips.

In fact, AVI video files adapt to the hardware they're played on. Capture a video file on a 486 with a 24-bit graphics adapter, and you can still play it on a 386 with an 8-bit VGA display. Of course, the trade-off (continued on page 68)



Our new color printer not only looks great on paper, it looks great on paper.

True, the brilliant color produced by the new Tektronix Phaser 8 200 is captivating. But the price is equally attractive. And though we've become the award-winning leader in color printers by frequently outdoing the

competition, this time we've even outdone ourselves. Introducing our newest business work





group color printer. The Phaser 200 is compatible with virtually any business software and can print two colorful pages per minute. No, not two minutes per page-two pages per minute. And even at a speed like that, it still manages to print eye-catching color on common laser paper or transparencies using a separate input tray for each. You select the medium you want at your computer keyboard. And it switches automatically from user to user just as easily, using its parallel, serial, AppleTalk,™ or optional EtherTalk™ and Ethernet™ ports

It has all the advantages of a laser printer. True Adobe PostScript™ Level 2, networkability, Pantone® colors, speed and price. (Did you notice it's only \$3695, slightly below unheard of?) And when you add to that extremely high materials capacity and sparkling TekColor™ output—not just any color, but the indisputably best color in the businessyou've got something even better than our previous best. Which is guite a feat.

So stop by your nearest Tektronix dealer or call us at 800/835-6100, Dept. 28D for a free

output sample. For faxed infor mation call 503/682-7450. ask for document #1223. You won't find another business investment that looks this good on paper.



Tektronix

AVERY'S LABELS DO WINDOWS

Savvy mass mailers have long favared Avery Dennisan's (800-252-8379) Personal Inhal Printer far Windaws: It's o wedge-shaped label printer with a thermal printhead that zips thraugh labels in less than 4 secands apiece. The \$249.95 product's DOS saftware, though, has always been dunky and baring.

Now, Avery has Windows saftware that affers Wysiwia label design, easy import of graphics or dip art, and direct manipulation of



text and images an any preset label template or custam design. It supparts all Windaws fants. You access features from a flaating toalbar that yau con invake fram any pragram ar place permanently an your desktap.

Windows databases affer similar moiling-label functionality, but if labels are all you need, the Persanal Lobel Printer is an easy salutian.

JON PEPPER

of disk space

VIDEO FOR WINDOWS, from page 66 is that your video images will be played at a halting 15 frames per second, with 16 dithered colors that barely resemble the original. Realistically, you'll want a 486/33 or better if you plan to work with video.

Video for Windows is cool, it's fun, and it'll definitely make people sit up and take notice. but is it practical? That depends. Even with compression, a minute of full-motion video takes up 9MB or more of disk space-which means you'll have to use it sparingly. Likewise, you'll need to manage your video files with a watchful eve. Video for Windows' \$199 price doesn't.

include the CD-ROM drive or the sound card that you'll need to take full advantage of itmuch less a video-capture board and a video camera recorder or laserdisc for recording your own clins.

Even so, desktop video has never been so affordable or accessible. If you were under the impression that deskton video is still a few years away, you're wrong. Video encyclopedias on CD-ROM, business presentations, and even training materials can take advantage of Video for Windows right now. Deskton video is definitely moving into the mainstream.

WENDY TAYLOR

Pour On the Desktop Video with VideoSpigot for Windows

Microsoft's Video for Windows softwore lets you edit, refine, and play digital video clips, but getting your own film footoge into your PC requires additional hardware. SuperMac's \$499 digital-video copture board. VideoSpigot for Windows, is a fost, easy, and inexpensive way to pour real-time motion video onto your hord disk or optical drive in a format that you can edit and use in everyday PC opplications.

Putting VideoSpigot to work is easy. Just drop the 16-bit cord into your PC and attach a TV. video comero, loserdisc, or VCR to the connector on the cord, and you're ready to capture video

SuperMoc includes o full-fledged version of Microsoft's Video for Windows for controlling the software end of copturing, editing, and playing bock your clips. It also tosses in Asymetrix's Medio Toolbook and MedioBlitz multimedia development ond outhoring tools, as well as Multimedia Make Your Point, a basic multimedia presentation progrom, so that you can get your feet wet using video right owoy.

Copturing your own video will cost you more than the price of the board, however. Even when the video is in digital formot, you'll still need ocres of hard disk space to store it. One frome of video eats up roughly 1MB; multiply that by the 15 to 30 fromes that make up one second of video, and you stort to see why video isn't turning up on everyone's hord drive—yet. But file compression helps, and VideoSpigot squeezes video clips down to a more manageable size; A one-minute

TV commercial for example, shrinks to about 9MB The video-copture rote determines the quality of o clip when it's played book, and VideoSpigot supports some of the highest. It tokes in video of up to

30 frames per second in a

160-by-120 window

or 15 fromes per second in a 320-by-240 window (anything slower than 15 fromes per second couses the video to look extremely jerky and images to lose detail). Video-Spigot coptures individual video frames for dropping into Windows documents as well.

The quality of VideoSpigot's captured clips isn't quite what you're used to seeing on a VCR or on TV-but it's close, and it's definitely some of the best video on a hard disk we've seen. It's also more than adequate for presentations, archiving. and even for cobbling together a preproduction rough of a studio video. There are no audio features on VideoSpigot; you'll need o sound cord and microphone for copturing sound to occompony your videos

VideoSpigot is one of the first boards to hondle video copture for Windows now that Microsoft is shipping Video for Windows. And ot \$499, VideoSpigot's price/performance combination is hard to beot. WENDY TAYLOR

VIDEOSPIGOT FOR WINDOWS, \$499 SUNNYVALE, CA 94086; I4081 245-2202

The most useful software I have ever owned. Info World columnist Steve Gibson

Instantly stores and finds all your personal and business information. Helps you make brilliant decisions. New Windows version. Just \$149%!

my hy did Steve Gibson say that? Because Info Select gives you a super-quick. super-easy powerful new way to manage all your personal and business information. Unlike the structured software you are familiar with, Info Select uses a clever new free-form technique, Info Select will open up a whole new world to you. And now is the best time to discover this new type of software - because the leading free-form Personal Information Manager INFO SELECT is now available for



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Finally you can clear away all the RANDOM information scattered across your desk: plans, notes, lists, actions, contacts, ideas, and much more. INFO SELECT will not only give you instant access to this important information ... it will help you make better decisions and see portant new relationships. Try INFO SELECT risk-free today.

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INFO SELECT is like having a 'photographic memory' that gives you perfect, superfast recall of up to 64,000 items of information

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Fred before he finishes his first sentence! No more embarrassing pauses or scrambling for information.

Specifications	
Average search speed	300 kb / sec
Platforms	Win, DOS
Organization	Free form
Customization methods	3
Windows per infobase	64,000
Characters per window	32,000
Search types	8
Fuzzy search	Neural
Data interchange methods	3
Sample forms	12

	Infe Select	
Elle Edit View Item Stack Form	Options Help	
With IMPO SELECT you store all you show a line when you have been selected in Mandands or Instant access to all your! ### TIME #### FIRST ###################################		ACCIAIMED BY: ** FG Message - FC Comparing - FC World - Info World - Comp. Shopper - MY Times - Byte office - Byte office - Byte office
Info Talact is extended memory for your heatel for your heatel it is this or lail survey for your heatel for your heatel it is this or lail survey for your heatel it is this or lail survey it is your your it is your your your	Central applications: **Enter your ideas* **Enter your ideas* **Enter your ideas* **Enter your ideas* **Truck project facts* **Ester olient data* **Panage sales ladde **Panage sales ladde **Panage sales ladde **Panage sales ladde **Enter your your your your your your your you	Manage all year HeMDOT precoal and busines Lafornation to reation typed and flexibility, Discover a whole new way to compate!
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now available in the all-new 100% Windows version. Now is the time to discover the most popular free-form Personal Information Manager

INFO SELECT also includes the You'll be amazed at how it works. Imagine all your random

information in convenient instant-access windows. The uses are endless

Rave reviews Editor's Choice "First rate"

"Rarely do I recommend a

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"Beats the pants off just about everything else."

"As easy as remembering vour own name."

The big picture

Have you ever worked on a complex project and felt lost? With INFO SELECT you'll group, scan, and cross search through all your notes so fast you'll see the big picture in Will I be better off doing this now

or that later? Keeping priorities straight can make or break your career or your business. INFO SELECT lets you keep on top of what's hot.

Should you use an east or west coast supplier? To make decisions you need facts. Now you can view the facts any way you like ... as fast as you can think. You'll make the best decisions ever - and fewer expensive

The right PIM

What's all the fuss about PIMs (Personal Information Mangers)? - you probably have more RANDOM information than any other kind and that's why PIMs are

important. Why is Info Select the right PIM for you? Because Info Select is free-form. You won't waste days or weeks learning complex structures. You won't spend all your time moving between modes and fitting data in fields. Instead, you'll be up and running in minutes. Info Select will never get in your way

Endless uses

Info Select can do much more than manage all your RANDOM information. Use it to organize business correspondence, sales leads, orders, and client notes. Track projects. Interrelate ideas. Catalogue parts, documents, and inventory items. Match buyers and sellers or doctors and patients. Edit E-mail. Store names and addresses, notes on magazine articles, and data about CD or video collections. Whether you're a professional, student, business owner. homemaker, entrepreneur, or hobbyist, you'll find countless uses for Info Select

Feature packed

INFO SELECT lets you manage notes, plans, lists, facts, letters contacts, and much more. You can search for a window or a group of windows related by a word or phrase. There is a fast sort, automatic address and phone number recognition, and with the dialer, date tickler, and searching by text or date ranges Info Select allows you to add columns of numbers in text, use template or free-form windows, import and export

files and databases, and much more LAN groupware

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Info Select is easy to use yet offers the power you need. You can have infobases up to 10 megabytes, split second searches, up to 32,000 character windows, and up to 64,000 windows per infobas

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Info Select has a great price of just get the PIM that can open up a whole new world of important uses for your computer? Order today and get ready

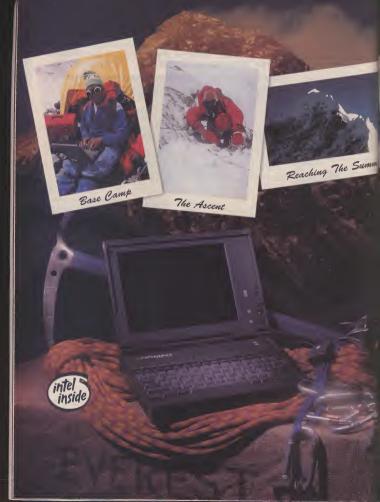
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Going to Extremes

If you want to know what the Gateway 2000 Nomad notebook PC can endure, just ask mountaineer Wally Berg. He took the Nomad 425DXL with him last fall on an expedition to the highest point on earth — the majestic, 29,128-foot Mount Everest in the Himalayan Mountains of Nepal.

Wally used the Nomad daily to track supplies, budget, and events of the climb. "Despite being transported over traces," terrain by yak, and operating in an unheated tent with temeratures outside of 20 to 30 degrees below zero, the Nomad performed then lessly," said Wally. "The size was perfect, too. We had so many supplies to carry that size and weight were a big consideration."

Wally powered the Nomad with three sets of NiCad batteries which he recharged with a solar panel. Wally said the batteries weren't affected by the frigid temperatures. Each battery always lasted up to six hours.

The expedition left for its final climb to the Everest summit shortly after midnight on October 9. They ascended toward the peak by moonlight, reaching the top at 8 a.m. "It was a feeling of total exhilaration to finally reach the highest point in the world," said Wally.

Even if you don't plan to take your Nomad to Mount Everest, it makes the perfect traveling companion wherever you journey. The Nomad weighs just 5.6 pounds and measures 8.5 x 11 x 1.8 inches. Standard features include: a 25MHz Intel® 486SX or 486DX processor; 4MB RAM; an 80MB hard drive (425SXL model) or a 120MB hard drive (425DXL model) or a 120MB hard drive (425DXL model) or a 150MB hard drive (425DXL when the shift of the shift

Nomad 425SXL ■ \$1995 Nomad 425DXL ■ \$2695

A Nomad gives you portability, 486 desktop performance, a great screen and keyboard, outstanding battery life — plus incredible durability. So take it from Wally Berg. If the Gateway Nomad can endure an Everest expedition, it can take almost anything!



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Two Clock-Doubled Notebooks Are Fast, but We've Seen Faster

SOUNDBITS: FUN BUT FRIVOLOUS

What's up, Dac? Microsaft's (800-426-9400) ggt the answer with its SaundBits callections (\$39.95 each), You can chaase sound clips from Cassic Hallywood Movies, Classic Cartagns from Hanna-Barbera, and Musical Sounds from Around the World

Each callection includes the MS SoundBits Brawser, which lets you brawse through and play back sounds. You can attach any sound to various Windaws events in the same way that you would attach any other WAV sound.

How useful are the sounds? While it's fun to hear Graucha Marx say "Just a mament, fruitcake" each time vau resize a windaw, it gets ald fast. ION PEPPER

CLOCK-DOUBLED SYSTEMS don't just come in desktop PCs anymore. Led by Texas Instruments, the first generation of 25/50MHz 486DX2-based notebooks is now beginning to reach market. We looked at two early entrants from Ergo Computing and Amrel Technology to see how much power you can pack in a 7-pound package. Neither machine delivered the rock-'em, sock-'em performance or battery life of Texas Instruments' WinDX2/50MHz (see January New!, page 46), though both offer features

not found in the TL. **Ergo NoteBrick**

Ergo's Nifty Fifty 486 NoteBrick is the newest addition to that company's crafty line of portables. It comes with Sanyo's 8.5-inch passive-matrix color display. Bright, with evenly saturated colors, the screen displays 256 colors at 640-by-480 resolution.

The NoteBrick measures a conventional 8.5 by 11 by 2 inches and weighs 6.7 pounds. Trim and handsome, it features one of the better keyboard lavouts we've seen. Desnite their sponginess, the keys are sized and spaced to allow for comfortable touchtyping. Full-size dedicated Page Up, Page Down, Home, and End keys line up along the right side of the keyboard. Function keys are full size as well-a welcome improvement over many keyboard designs.

In raw-processing chores, the NoteBrick performed about three times as fast as most top-of-the-line 25MHz

> 386SL notebooks and twice as fast as 25MHz 486SL systems. It larged behind TI's 50MHz WinDX2 primarily in video and memory chores, and an external cache would have boosted its performance against the Amrel in our Lotus 1-2-3 and Windows benchmark tests. By far, video remains its biggest bottleneck.

Still, the machine is no slug, and dollar for dollar, it's competitive. Monochrome versions of the 486DX2/50-based NoteBrick start at \$2,995; color models start at \$3,995. Our color model came stocked with 8MB of RAM, a 180MB hard drive, and AddStor's SuperStor data-compression software (which raises the effective storage capacity to 360MB). That configuration cost \$4,795

The NoteBrick's greatest compromise is



Amrel's MLT486DX2-50 (left) and Erga's calar NoteBrick (right) 50MHz dock-daubled natebooks after fast processing, but they can't match Texas Instruments' WinDX2/50MHz.

battery life. It held 1 hour and 37 minutes of charge in our run-down tests with all powermanagement features turned off. It lasted longer than the Amrel-which held up for a measly 1 hour and 13 minutes-but nowhere near the WinDX2's 3 hours and 25 minutes. TI achieves this long life through a patented technology that switches the real-time CPU to 0MHz when the processor is idle. This also keeps the DX2 processor cool; hot chips are a serious problem with clock-doubling technology. The NoteBrick cools its CPU through a small, quiet fan, using traditional powermanagement utilities to prolong battery life.

Amrel MLT486DX2.50

The Amrel MLT486DX2-50, on the other hand. relies solely on a heat sink for cooling, which could be a (continued on page 74) Are you the kind of person who'd buy Harvard Graphics
from Software Publishing Corporation just because

1.4 million people already have? No way, not you. How about the

fact that Harvard Graphics has become the best-selling presentation graphics software of all time by being the easiest way to make great presentations? Interesting, but you're still not reaching for your wallet. You're more the So what can it do for me?" type. And to be convinced, you really need to see it. Perfect. We like people like you. Which is why we've put together a free demo disk on Harvard Graphics 3.0 for DOS and Harvard Graphics for Windows. So you can see exactly how you can make great charts and presentations without a great deal of effort. Just call 1-800-336-8360, Operator 906. Because we have 1.4 million reasons to believe that once you see Harvard Graphics, you'll buy it







GLITZY VIDEO

Encydopedias are staples on the CD-ROM software shelf, and Grolier's (800-356-5590, 203-797-3500) updated, \$395 Multimedia Encyclopedia is the best we've seen. This classic now affers a limited number of diaitized-video sequences (induding Neil Armstrong's moan walk and a Jahn F. Kennedy speech), thousands of new articles. new interface aptions. and raughly 3,000 fullcalar and black-and-white illustrations. The digitized video is available in the DOS versian, while animation is available for the MPC version. We found video quality and ease of use much better in the MPC version-it's the version to buy.

Grolier has added a Timeline and Knowledge Tree for navigation. The former pravides a graphical perspective of history. and from the Timeline you can access articles for any era. The Knawledge Tree affers a broad categorical laak at subjects and is a useful precursor to looking up detailed references on topics. There's still room for improvement. hawever: Annayingly, only some of the illustrations are printable. Still. vau won't find a whizzier, mare approachable encyclopedia anywhere. JON PEPPER NOTEBOOKS, from page 72

problem given how hot it gets inside a notebook computer. The MLT features an upgradable CPU and a built-in pointing device. The machine is rather hefty—it measures a bulky 8.6 by 11.5 by 23 inches and weighs a full 7 pounds. It features Sharp Electronics' 9.5-inch LCD monochrome display, which displays 64 shades of gray through dithering. We found the display to be a bit murky, though adequate.

One advantage of the Amrel notebook's extra thickness is that the keys have a longer travel than they do on most notebooks. This benefit is undercut only slightly by the light touch of the keys; we prefer more tactile resistance in a keyboard. Like the Ergo NoteBrick, the Amrel MLT486DX2 offers a fine keyboard layout, complete with full-size Page Up, Page Down, Home, and End keys—it even has dual Alt keys.

Unfortunately, the system is plagued by design flaws. To upgrade the CPU, for example, you have to remove the keyboard—a perilous and delicate process that only a dealer should attempt. Also, the pointing device, which is a miniature trackball mounted on the front of the unit with buttons positioned on either side, is one of the worst designs we've seen.

Manipulating the ball requires cocking your
wrist at a 90-degree angle, which makes
subtle movements with your thumb difficult—
and painful.

You can't fault the machine's performance, however. Our MLT nosed ahead of the Note-Brick in memory and Windows chores, thanks to the optional \$89 128K external eache that came with it. It dallied in CPU chores, however. Texas Instruments' machine performs better overall because of its fast video and memory.

With 4MB of RAM, a 120MB hard drive, and a 128K external eache, our Amrel system cost \$3,195. This sertainly a competitive price for a 50MHz clock-doubled notebook, but you can find a much better machine for the money. The bottom line: You still earl' find a faster, more impressive clock-doubled notebook than the under-\$4,000 Texus Instruments WinDX2 reviewed in our January issue. MART MEMOR.

ERGO NIFTY FIFTY 486 NOTESRICK, \$4,795 ERGO COMPUTING; ONE INTERCONTINENTAL WAY PEABODY, MA 01960; [800] 633-1925, [508] 535-7510

AMREL MLT486DX2-50, \$3,195 AMREL TECHNOLOGY; 9952 E. BALDWIN PLACE EL MONTE, CA 91731; (800) 882-6735, (818) 575-5110

Cheap Tape Drives Provide Storage For the Masses

PARALLEL-PORT TAPE DRIVES may not be the fastest backup solution around, but if you have more than one system to back up, they're unbeatable.

The beauty of a parallel-port tape drive is that you can just pop its cable into your printer port and go. Because you don't have to worry about installing an adapter card or attaching the device to your floppy drive controller, parallel-port tape drives make backing up your systems shame-lessly easy.

We took a look at two of the hottest new devices on the market—250MB versions of Maynard Electronics I rivin EzPort and Colorado Memory Systems' Jumbo Trakker 250—and we were impressed. Of the dozen or so parallel-port tape drives we've looked at, these two are the best deals we've seen.

They also have a lot in common: Both de-



CMS's Jumba Trakker 250 tape backup drive (left) is faster than Maynard Electronics' Irwin EzPort (right).

vices offer built-in power supplies, so you need only an AC adapter to plug them in. And both offer printer pass-through connectors—you plug your printer into the back of the tape device, and you don't have to give up your printer.

Though it was a close call, our favorite was the \$548 Trakker. The 5-pound device was a bit faster than its (continued on page 84) "i want a hot, well-built 486 that comes with a low price. and high praise." you know what you want.

be direct.

DECpc bests low-cost 486DX field.

Performance, expandability and design stand out.

--- PC Week, October 5, 1992

The four-star reviews Digital™ is receiving for our upgradable new LP line tell you a lot about our PC story. We know what you want when it comes to speed,

performance and ease of networking. You want a PC that's

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become an integral part
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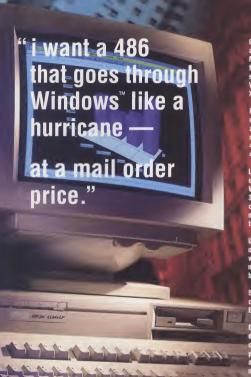
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Using VRAM instead of DRAM speeds video operation by minimizing graphics bottlenecks

512KB internal cache is standard. Expandable to 1MB

Our mother has a daughter. This one carries the microprocessor, cache and data bus for system upgrades. Dollar for dollar, the DECpc 433dx LP is one of the best computing systems you can buy.

- PC Computing, January, 1993

ick your brain. Or expand it.

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esktop irect But before we get ahead of ourselves, Digital's upgradable LPs, with 486SX, 486DX and 486DX2 industry-standard microprocessors, are available in a wide range of speeds.

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So you can choose exactly what you need now. And grow when you're ready. There's room to add up to 64MB RAM on our mothercard.

And these DECpcs not only come with a 128KB cache standard — with room for up to 256KB — it's writeback cache ... the single most advanced memory-caching strategy available.

In other words, to give *your* imagination the tools it craves,

Digital engineered flexibility into our upgradable Desktop family every
step of the way.

Benchmark Tests: The DECpc 450d2 LP

We tested the clock-doubled 50-MHz DECpc 450d2 LP, one of six machines in Digital's new DECpc LP series, and found that its implementation of local-bus video yields outstanding results on our Graphics Winmark benchmark test.

We used PC Magazine Labs' Hardware Performance Tests, Release 6.0, to measure each PC's performance. The Graphics Winninar's is the geometric mean of 12 Windowsbased graphics tests from WINBERCH 2.5, weighted to reflect how frequently various functions are used.

Highor scores represent better performance.	Processor (operations per second)	Memory (kilobytes per second)	Oisk (kilobytes per second)	(thousands of operations per second)	Winmark (megapixels per second)
DECpc 450d2 LP (486DX2/50)	506	5,406	193	2,182	12.98
50-MHz 486DX2 average	487	6,430	276	2,539	5 51
Delf System 4860/50 (486D)(2/50)	450	5,525	241	4,272	1.58





DECpc 433dx LP

- i486DX 33MHz System • 128KB Writeback Cache
- 4MB RAM
 122MB IDE Hard Drive
- 14' VGA Color Monitor
 3.5' 1.44MB Floppy Drive
- Keyboard and Mouse
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DECpc 450d2 LP

- i486DX 50MHz System
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 4MB RAM
- 122MB IDE Hard Drive
- 14' VGA Color Monitor
 3.5' 1.44MB Floppy Drive
 Keyboard and Mouse
- MS-DOS 5.0 & Windows 3.1



DECpc 466d2 LP

- i486DX2 66MHz System • 128KB Writeback Cache
- 4MB RAM
- 122MB IDE Hard Drive
 14" VGA Color Monitor
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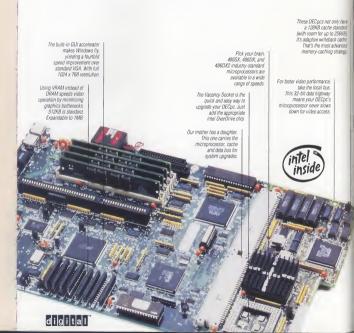
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very Digital desktop product comes with two other important engineering differences. Digital is one of only a handful of companies in the world to build PCs in an ISO 9000-compliant factory. And every Digital desktop product is network tested with every other industry-standard machine available, from GENTIFIED IBM* PS/2* and OS/2* to COMPAQ* Sun Workstations* and Macintosh*. We use the 70,000+

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networking configurations.

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- PC Computing, January, 1993

Scoreboard							LABS
Based on a scale of 1-5 (5-excellent)		Advanced Logic Research Inc. Flyer 32DT 4DX/33	AST Research Inc. Bravo 4/23 Model 12/3B	Dell Computer Corp. Dimension 486DX/33	Digital Equipment Corp. DECpc 433dx LP	IBM PC Co. PS/1 Model 2155-S76	Zenith Data Systems Z-433DX Model 200
Overall weighted acore		3.6	3.5	2.4	4.0	2.8	3.4
1. Price vs. performance	(30%)	4	4	2	4	3	4
2. Performenca	(25%)	3	4	2	4	3	3
3. Expendability	(25%)	4	3	3	4	2	3
4. Serviceability	(10%)	3	3	2	4	3	4
5. Quality of construction	(10%)	3	2	3	4	3	3

 Overall performance relative to cost (comparative among these six machines).
 Overall comparative system performance in all lests.
 Support for processor, memory, storage and expansion board upgrades.
 Ease of processor, memory, storage and expansion board upgrades.
 How well the system is assembled including case design, power supply and tools required for assembly.

Natiresponsible for two sprephical errors. Products may vary from photographs.

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DECpc 325SL: the notebook that upgrades as fast as your workload.

The DECpc 325SL Series Notebook gives you the power, memory, expandability and full upgradability of a desktop PC. In fact, this 5.9 pound, fully loaded road warrior actually converts to a desktop model in less time than it takes to brew your morning cup of coffee.

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It's the only notebook you'll ever need. It may be the only PC you'll ever need. Consider this: the DECpc 325SL Notebook comes standard with 25MHz, 4MB RAM, 64KB cache, and an 80MB IDE hard disk. As your

needs grow, just upgrade the processor from 386SL to 486SL, the display from monochrome to passive or active matrix 256-color, the hard disk from 80MB to 120MB and the RAM from 4MB to 8MB, 12MB or even 20MB. And you no longer have a simple notebook, you have a top-of-the-line, full-power PC that travels.

Plus, the DECpc 325SL is one of the first notebooks to offer two industry-standard PCMCIA expansion slots. Just snap in a credit card-size data/FAX modem, an Ethernet card or a SCSI adapter, and the DECpc 325SL Notebook becomes as versatile as the best equipped desklop PC.

DECpc 325SL Docking Station. Take your Notebook as far as it'll go.

Bring your Notebook up to full desktop performance by adding the DECpc 325SL Docking Station. The Docking Station expands notebook I/O option card capability, so you can take advantage of a wide array of desktop peripherals and storage devices. It also lets your notebook communicate effort-lessly with desktop PCs and workstations (via the optional Ethernet controller card), and creates PCSA (Digital's Personal Computing Systems Architecture) compatibility.

*Digital has just the right portable or transportable printer to accompany your DECpc 285SL Notebook. (Leasing available — call for information). *Warranty coverage may be extended with one- or two-year Return-to-Factory Contract Extension. *Warranty coverage may be enhanced with DEC Passport Service.



DECpc 325SL Notebook

Base System

* i386SL 25MHz System

* 4MB RAM

* 8MMB HArd Drive

* LCD VGA Super Twist Sidelit
Display (64 grey scale,
D;5 idagonal)

* 3.5" 1.44MB Floppy Drive

* Removable trackball

* 6.5 hour battery

\$2,399

DECpc 325SL Notebook Plus 386SL 25MHz Syste

*i386SL 25MHz System
 *4MB RAM
 *12MB HArd Drive
 *LCD VGA Super Twist Sidelit Display (64 grey scale, 9.5° diagonal)
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DECpc 325SL Color Notebook

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256-Color Passive
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Removable trackball
 6.5 hour battery
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DECpc 325SL Docking Station

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NOTEBOOK SECURITY 101

If some lowlife pilfers your notebook computer, you've lost doto os well os money, PC Guordion (800-288-8126, 415-459-0190) hos o cool security device that comes to the rescue.

The Notebook Guardion is o smoll locking device that attaches easily to most leading notebook PCs. A 5-foot steel cable secures the device and the computer to a stationary object such as a desk. If data security is your concern, you con add o screen lock to the Notebook Guardian. This device physically locks the screen down, preventing unauthorized occess to the screen or keyboard.

The Notebook Guordian sells for \$69.95, or \$79.95 with the optional screen lock. That's expensive, but so is a stolen notebook.

JEFF GREENBERG



TAPE BACKUP DRIVES, from page 74 Livin-standard competior, I to empleted our backup of 17MB in just 11 minutes and 32 seconds with error-correction and read-verify enabled, and it took 4 minutes and 10 seconds without those options. That compared with the EzPort's times of 11 minutes and 45 seconds and 6 minutes and 20 seconds, respectively. The Trakker comes with Colorado Backup for DOS, which you can launch by clicking on a Windows icon.

Maynard's EaPort is another well-designed driven, and it weighs just 2 pounds, 14 ounces. (You can make this two-pleee device into a traditional adapter-style tape drive if you like. Just pop it out and connect it to Maynard's proprietary 8-bit 4100 card.) Priced at \$548 for the 250MB version, the EaPort comes bundled with EzTape for DOS, a slick little backup package. It offers an easy-to-use mouse-compatible menu interface and includes an indexing system for your backup tapes. (EzTape for Windows is forthcoming, officials say.)

Which should you buy? That depends, obviously, on which standard you're currently entrenched in-Irwin or QIC. If speed is your goal, the Trakker is faster. Either drive, however, is a bargain if you need a portable device to back up the data on your PC or notebook.

GINA SMITH

IRWIN EZPORT, \$548
MAYNARD ELECTRONICS; 36 SKYLINE DR
LAKE MARY, FL32746; (800) 821-8782, (407) 263-3500

JUMBO TRAKKER 250, \$548 COLORADO MEMORY SYSTEMS; 800 S. TAFT AVE. LOVELAND, CO 80537; (800) 845-7905, (303) 669-6500

Bootcon: The Most Efficient Way to Configure Networked or Standalone PCs

SAY YOU HAVE a couple of TSRs that you use infrequently, or perhaps a program that doesn't fit when your network is in memory. Maybe you only want to load a Windows configuration once a week. Face it, between editing your system's configuration files and managing multiple copies of CONFIGSVS and AUTOEXECBAT files, you're busier than a cobra at a monosose convention.

So check out Bootcon, a \$79 package from Modular Software Systems of Kent, Washington, that spares you the nuisance of managing multiple configuration files. With Bootcon, managing a boot-up process with different configurations is automated. If you manage lots

> of configuration files on a LAN, Bootcon will be exponentially more valu-

able to you.

Installing Bootcon is easy, thanks to the Quick Installation section of the manual. If you already have some experience working with your CON-FIGSYS and AUTOEXEC-BAT files, it's the only documentation you'll need. A longer and more detailed section of the manual helps less experienced users.

Our conclusion: Rank be-

ginners won't want to fool around with Bootcon.

Only programmers love README files, but don't skip Bootcon's—it's full of useful compatibility notes. For example, Bootcon is compatible with PC-DOS and MS-DOS through Version 5.0. If you run DR DOS 6.0, you can get a special version from Modular Software. The program is also compatible with Stacker.

At your discretion, BootCon installs templates in both your CONFIG.SYS and AUTO-EXEC.BAT files (renaming your original versions and storing them for you). You then edit your startup files into structured blocks of code, each of which lists a different configuration, using the template as a guide. Depending on the configuration you choose at startup, Bootcon executes the appropriate block of code. This can be a lifesaver if you do a lot of troubleshooting. Bootcon lets you create up to 26 distinct configurations and also lets you set other ootions, such as passworn.

Once you've edited your configuration files, just reboot, and Bootcon will present a simple menu of choices. Choose one configuration, and Bootcon will load your PC with it. Best of all, you can say goodbye to multiple configuration files and tedious editing chores.

DALE LEWALLEN

BOOTCON VERSION 1.60, \$79, DR DOS VERSION, \$89 MODULAR SOFTWARE SYSTEMS; 25825 104TH AVE. SE, SUITE 208 KENT, WA 98031; (800) 438-3930, (206) 631-5781



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Ink Jet Printers from Canon and **HP: Quality Output on the Road**

CANON'S OUTPUT WINS

Canan's printer has the clear advantage over HP's when it comes to output quality, as you can see from the upper graphic-which comes fram the Canan—when campared ta the lawer graphic, Nate the grainier, lighter laak of the lower hause. Why? Canon's



printer daes 360 dots per inch; the HP does 300 dpi. Text alsa laaks crisper caming fram the Canon. We recommend it if print quality is a priority. As far speed, we found little difference between the two.



IF YOU'RE TORN between huving a dot matrix or low-cost laser printer, don't forget about ink jet printers, particularly the portable kind. Ink jets like Canon's BJ-200 and Hewlett-Packard's Desk.Iet Portable provide the business-quality output of lasers and are quieter and more compact than dot matrix printers. Best of all, you can take them on the road.

Canon BJ-200

Canon's \$549 B.I-200 Bubble.Jet. printer is the perfect compromise between a dot matrix and a laser. With its 360-dot-perinch resolution and small 14-by-7-inch footprint, the BJ-200 prints fine text and won't hog

your desk. It prints on plain paper and transparencies and includes a built-in 100-sheet paper feeder. The BJ-200 isn't a portable printer per se-there's no battery pack and it's not as trim as Canon's BJ-20-but at less than 7 pounds, it's easy to move.



Hewlett-Packard's DeskJet Portable, on the other hand, aims for portability. While not as compact as Citizen's 2.5-pound PN48 Note-Book printer, the DeskJet Portable weighs less. The \$599 DeskJet Portable weighs 4.8 pounds, measures 12 by 5.75 by 2.5 inches, and includes an AC adapter and rechargeable NiCad battery that lasts for up to 100 pages per charge. Like most portable printers, the DeskJet Portable uses a manual paper feed; a 50-sheet paper feeder is available for \$99.

The best-looking text on all ink jets is sans serif on heavy bond paper, but even the serif text printed by these two portables on regular copier paper is acceptable for business use. The Canon BJ-200's 360-dpi resolution has the edge on the DeskJet Portable's 300 dpi for both text and graphics. The two printers were equally fast, however, taking just under 4 minutes to print our 5-page Word for Windows test document. Even if you use these printers



HP's DeskJet Partable ink jet (left) takes business printing an the raad, but Canan's BubbleJet 200 (right) has better resolution.

as standard desktop solutions in the office, speeds won't frustrate vou.

The DeskJet Portable supports PCL 3 emulation and includes four typefaces in several point sizes. The BJ-200 includes only two typefaces in its native mode, although switching to its Epson emulation gives you access to seven additional styles. Both printers come with Windows 3.1 drivers and feature controlpanel buttons that are located on top for easy access. Hewlett-Packard takes convenience one step further by eliminating dip switches entirely and including a parallel cable with its printer.

The verdict: The HP DeskJet is the best buy if portability and usability are your priorities, but buy Canon's BJ-200 if print quality matters most. As you can see from the output samples at left, the Canon's support for higher resolution printing makes its graphics stand out. The Canon's list price is lower, but Hewlett-Packard's notoriously low street prices should compete.

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CANON BJ-200, \$549 CANON COMPUTER SYSTEMS

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386MAX runs Windows so fast you'll need a seatbelt. With QEM you may need something else.



ou probably know by now that a memory manager can enhance the per-

formance of Windows™ on your computer.

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and "... during a QEMM-386 never-never land. That almost never happened with 386MAX." (PC Magazine).

Speaking of 386MAX,9 we suggest you try it instead. Because 386MAX lets you run Windows with unmatched reliability and.

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as BYTE puts it, "seems to work flawlessly." And that can mean avoiding a lot of

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BYTE sums it up perfectly: "The best of these programs is 386MAX (or BlueMAX™ for a PS/2). It's so easy to use and offers such significant benefits that it should be part of every... system."

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1-2-3 for Windows Release 1.1 now includes over 25 new features and usability enhancements.



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It's true. When you evaluate our complete solution for Windows™ desktops and then look at theirs, you'll see why ours is a better business choice.

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for example, share data, text and graphs between each application smoothly and seamlessly. So when an outline produced in Ami Pro is imported to Freelance Graphics. it's automatically converted into a Freelance Graphics outline and full-slide presentation. And a 1-2-3 graph exported to Freelance Graphics will arrive, fully editable. Not so with Excel and PowerPoint."

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cc:Mail, the world's leading LAN-based e-mail system, allows you to send documents across all major networks and computing platforms.

applications just by clicking the icon of the application you want to open.

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Why is now the best time to buy Lotus SmartSuite instead of Microsoft Office?

For one thing, you just can't beat the total

value. In fact, for a limited time," when you buy SmartSuite, we'll give you Lotus Organizer" (a \$149 value"*) absolutely free. It includes an on-screen calendar, to-do list, planner, address book, notepad and anniversary reminder that are all fully integrated. Plus if you're upgrading from any version of 1-2-3, Symphony," any Lotus word processor or graphics product, or cc:Mail, you'll save even more. So do the smart thing. Visit your Lotus Authorized Reseller or call

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PCComputing UPDATE



New Sound Cards

As the clomor in the oudio-cord morket increases, monufacturers are stoking out PC audio territory. Three new entries show the different ways you con wire your computer for sound.

Antex Electronics believes the future of oudio rides on multime-dio. The compony's Antex Madel Z1 is copoble of 16-bit (stereo) somples or 44.1 kHz. It uses o digital signal processor, o SCSI interface for connecting to a CD-ROM drive, and a built-in Yomoho YMF 262 synthesizer. (\$595; Antex Electronics Corp.; 800-338-4/231 3.10-53-3.092).

Mouse Systems Corporation, on the other hand, believes that outlow will play a more modest role in business opplications. Its SaundWave cord, intended for annothing business documents and spreadsheets, is copoble of only 8-bit (mono) sampling, which gives it the same copobilities as Logitles's Audiou. SoundWave comes with a microphone and speakers with a microphone ond speakers with a microphone ond speakers (S279', Mouse Systems Corp.; \$10-656-1112).

Ad Lib MuhfMedio, o veteron in PC oudio, hos begun shipping its Surraund Saund Madule, on addon board for the compomy's 12-bih Ad Lib Gold 1000 oudio board. Aimed or business-presentation users, the Surround Sound Module provides stee-odepth simulation and echo and reverberation features that I users add sound effects to presentations. (SSP.95). Ad Lib MuhfMedio; 800-463-2686, 485-29-9676)

THE LATEST UPGRADES TO PRODUCTS YOU USE BY MARTY JEROME

WordPerfect Presentations 2.0

WordPerfect Corporation has revamped and renamed its DrawPerfect I.1 presentation package. Now called WordPerfect Presentations 2.0, the program comes in DOS and Windows versions. The upgrade automatically traces bitmaps for vector graphics and supports organizational and threedimensional charts. (8495; WordPerfect Corp., 800-451-5151, 801-2225-5000)

Microsoft Word for Windows 2.0c

A maintenance release of Word for Windows-Version 2.0c—is now shipping. It lets users e-mail Word documents as attachments or text and includes an updated (BASE converter that allows the program to read Microsoft FoxPro for Windows files. Version 2.0c also fixes some minor glitches. (Free to registered users; 800-426-9400, 205-882-8800



IBM's Tiny Hard Drive

Nq, it's nat a solid-state starage device. It's a true 105MB 1DE hard drive with a spinning platter and read/write head fram IBM. Fully compatible with PCMCIA 2.0, this lillipation drive measures less than 3% by 2 by % inches—smaller than a deck of crads. You just play fit ind may PCMCIA enabled natebook computer. There was na price at press time. (IBM: 200-772-9227)

Toshiba T6400MM Portable PC

Toshība America has introduced a multimedia version of its top-of-the-line T6400 portable systems. Designed for slick sales presentations, the 12.9-pound, AC-powered portable comes with a 10.4-inch active-matrix color display, a preinstalled digital video interactive board, portable speakers, a pointing device, and a raft of software. (89,599; Toshība America Information Systems; 808-383-4445, 14-583-3000)

Lotus Ami Pro 3.0 Macro Developer's Kit

The Ami Pro 3.0 Macro Developer's Kit, a set of programming utilities for Lotus Development's flagship word processor, is now shipping. The utilities include 70 pre-programmed macros. (\$9.95 for handling; Lotus Development Corp.; 800-831-9679, 404-391-0011)

General Parametrics Spectra Star Q10, Q40, and Q50

General Parametrics has unveiled a new line of color thermal printers. The Spectra*Star Q series includes three models: the Q10, which retails for \$4,999; the Q40, which comes with a 40MB hard drive and sells for \$6,799; and the \$13,798 Q50, which includes a 40MB hard drive and a 35mm slide maker. General Parametrics Corp.; 800-223-0699, 510-524-3950)

Practical Peripherals' Practical FaxMe PF100

Modem maker Practical Peripherals has introduced a receive-only fax cartridge that plugs into most Hewlett-Packard LaserJet Series II or III font-cartridge slots. It receives faxes at 9,600 bits per second and produces them on plain paper. (\$259; Practical Peripherals; 800-422-4774, 805-497-4774)



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PCComputing UPDATE



ATI Technologies' Media Merge, a videa-editing suffware pockage far Vindaws, debuts hat an the heels of Microsoft's Videa far Windaws, dereview no page 66). Media Merge lets you lay aut videa in a time-line farmat and cames with a mediale far menipulating sound, a special-effects pragman, and a utility for adding transitions such as wipes and fades to videas (SaSPs 211 Enhanlagies.)

416-756-0718)

FexMoster Server is now shipping. This server-bosed fax and aptical character recognition package
far work, groups provides fax-board
and phone-line sharing, centralized
fax management far autbound
faxes, and job queuing far up
to 25 users. Each client workstrstian of Fax-Master installed. FaxMaster Server works an Novell
networks; as well as an peer-trapeer
networks from Antisoft and

Microsoft (\$695 for FoxMoster

version: Coere Corp.: 800-462-

Server \$149 for each single-user

Caere Corporation's

2373, 408-395-7000)

NewGen Systems'
ImageUp is on upgrade board
that raises the resolution of Febeure 12 for 18 f

0556, 714-641-8600)

Intel 3875X Math Coprocessor

Intel's 33MHz 387SX math coprocessor is shipping with the first wave of 33MHz 386SX systems that are now reaching market. (\$99; Intel Corp.; 800-538-3373, 408-765-8080)

NetWare Version 4.0 Software Developer's Kits

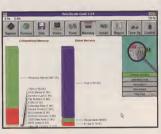
Developers who want a head start on building client application program interfaces (APIs) for Novell's forthcoming NetWare 4.0 can now get software developer's kits from the networking Goliath. (8395; Novell; 800-733-9673, 512-794-1796)

Fastback Plus Windows 1.02

Fastback Plus Windows 1.02 from Fifth Generation Systems supports Windows for Workgroups, allowing users on the network to back up PCs other than their own. (8189; Fifth Generation Systems; 80-873-4384, 504-291-7221)

Complete Communicator EZ

The Complete PC has an addition to its line of PC-based messaging systems. Complete Communicator EZ integrates a 2,400-bps data modem with a 9,600-bps fax, a voice-messaging system, and its new Rapid Fax fax soft-ware. (S199; The Complete PC; 800-229-1753, 408-4349-1045.



Overdue for a Tuneup?

WinSlewth Gold Version 3.04, the latest release of the diagnostics software from Dariana, features are expanded help feature that graphically shows where system failures occur. The new TuneUp utility analyzes your AUTOEKCEAT, CONTIG.STS, WIRLIN, and STSTEM.NI files, then offers suggestions show how to tweek them for better performance. (\$169, Dariana; 800-892-9950, 714-736-1380).

Alpha Four 2.1

Alpha Four, the relational database for nonprogrammers, has received a performance boost. Version 2.1 sorts, copies, exports, and updates as much as ten times faster than Version 2.0, according to company officials. (\$495; Alpha Software Corp.; 800-451-1018 ext. 117, 617.299.9934).

ZSoft PhotoFinish 2.0

ZSoft and WordStar International have jointly begun shipping PhotoFinish 2.0. The upgrade supports JPEG compression standards, object linking and embedding, device calibration, additional filters, and special effects, among other features. (§199; ZSoft Corp.; 800-444-4780, 404-428-4008)

Hayes Optima 144 Plus Fax144 Pocket Edition Modem and Optima 24 Plus Fax96 for PCMCIA

Two diminutive additions to the Optima line of fax/modems are now available from Hayes Micro-Computer Products. The \$599 Optima 144 Plus Fax144 Pocket Edition, as 8-ounce, battery-powered V32bis pocket modem, sends and receives faxes and data at 144 kilobits per second. The Optima 24 Plus Fax96 for PCMCIA, a credit-card-size fax/modem, sends and receives data at 2,400 bps and sends and receives faxes at 9,600 bps. (\$399; Hayes Microcomputer Products; 404-840-9200)

There's a lot of talk about speeding up Windows.



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Epson's[®] new Progression[™] PC makes Windows[™] race so fast (up to ten times faster), you have to see it to believe it.

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TOP DEALS FOR YOUR PC

BY PRESTON GRALLA



Cool Deal on High-Quality Color

High-quality color now fits just about any budget: For \$199, you get a copy of PixoFoto Lite image-editing software and a 24-bit color graphics board powered by a chip from Cirrus Logic.

PixoFoto Lite is a speedy DOSbased image-editing program that lets you retouch black-and-white or color photos and create high-quality graphical images. Its 24-bit color board displays up to 16.7 million colors. Call Pixo Arts at (415) 323-6592 for details.

Get DOS and Windows Versions Of DacEasy for Under \$50

If you're looking for inexpensive, easy-to-use accounting software, look no further. Check out DacEasy Instant. The program is designed for people who need an accounting program but draw a blank when they hear a simple accounting word like debit. It's an all-in-one package that not only handles accounting chores but also lets you send faxes, do mail merges, and keep track of your phone calls. The price is a remarkable \$4195. And here's the kicker? You get two copies of the program—DOS and Windows versions—in the same box. Call DacEasy at (800) 222-23279 for details.

PC Contact

Great Deal on

It's that time again—tax season. This year, use your PC to help you do your taxes and do them with inexpensive software: Try out a copy of AM-Tax 92, an excellent shareware tax preparer. You can get a copy of the program di-

rectly from PC/Contact as AMTX92.ZIP from data library 3 (Utilities/Misc.). AM-Tax 92 handles form 1040 and forms A, B, C, D, E, F, R, and SE, You can buy a registered version for \$20. For \$30, you can get a version that also handles your particular state's forms.

Several other versions of the program are also available, including some that handle more sophisticated forms and schedules. Professional tax preparers can order a high-end version. For details, call AM Software at (816) 426-8361 or write to the company at P.O. Box 25010. Kansas City. MO 64119.

BEST SOFTWARE BUYS

Where can you get the best software deal? Usually through the mail. We surveyed mail-arder houses and came up with the best prices we could find. The following prices include shipping and handling charges: but not credit-rard surfaceure. Prices are as of press time and are cubilent to change

PRODUCT	LIST PRICE	BEST PRICE	SOURCE
DOS 5.0 Upgrode	\$99.95	\$47.99	ET Valueline, (800) 395-1000
Excel 4.0	\$495.00	\$292.00	Softwore Unlimited, (800) 926-7638
Lotus 1-2-3 3.1 Plus	\$595.00	\$394.95	Computability, (800) 558-0003
Microsoft Word 5.5	\$450.00	\$203.00	Saftware Unlimited, (800) 926-7638
Norton Utilities 6.01	\$179.00	\$110.00	Software Add-ons, (800) 695-8088
QEMM-386	\$99.95	\$60.00	Software Add-ans, (800) 695-8088
Quottro Pro 4.0	\$495.00	\$299.00	Softwore Add-ons, (800) 695-8088
Windaws 3.1	\$149.00	\$84.99	ET Volueline, (800) 395-1000
Word for Windows 2.0	\$495.00	\$249.99	ET Valueline, (800) 395-1000
WordPerfect 5.1	\$495.00	\$255.00	Loma, (800) 369-2846; or Softwore Add-ons
			(800) 695-8088
WordPerfect for Windows	\$495.00	\$255.00	Lama, (800) 369-2846; or Softwore Add-ons
			(800) 695-8088

PCContact

Two Cheap TrueType

There's good news for font futzers: Two TrueType font collections are available at two great prices.

The first is Top Fonts from Elfring Soft Fonts, which has 125 TrueType fonts. The collection costs \$109.50, but mention that you read about it in this column and get \$20 off.

You can also get the Top Fort Sampler, a collection of eight Top Fonts, as shareware. Download TOP-FNTZIP from PC/Contact's data library 3 (Utilities/Misc.). The registration fee is \$20. Call Elfring Soft Fonts at (708) 377-3520 for details.

The Best Way To Send, Receive and Manage Faxes

Introducing WinFay PRO 3.0

WinFax PRO 2.0 made it easy to send and receive faxes, winning PC. Magazine's prestigious Best of 1991 award in the process. But we didn't stop there. New WinFax PRO 3.0 changes the face of PC faxing once again, putting a full spectrum of powerful tools at your fingertips.

The Freedom of PC Faxing

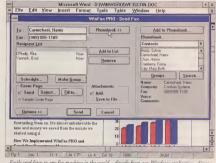
Now, you can "one button" fax from any Windows application to any fax machine in the world. Easily combine documents from multiple applications and fax to individuals or groups anytime you want. All from the convenience and privacy of your own PC. The wasted time and aggravation of old-fashioned faxing is a thing of the past.

Powerful Tools To Manage Your Faxes

WinFax PRO's advanced document management tools enable you to file. track and quickly find the faxes you've sent or received. Mark up faxed documents right on screen. using our fully featured text and graphic annotation tools. And AnyFax™, the most advanced OCR software for faxes, directly converts them for editing in your favorite word processor or spreadsheet.

Plus, as a special introductory offer, WinFax PRO 3.0 contains Cover Your Fax[™] = a FREE \$39.95 value = for a limited time only. 101 great fax cover pages to suit all occasions. Perfect for your business or personal use.

Circle 318 on reader service card.



Easily send faxes to any fax machine in the world... directly from any Windows application. Since WinFax PRO 3.0 installs just like your printer, you can fax anything that you can print.

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WinEsy PRO 2.0

Software Saleswire

Peer-to-peer networking is heating up. Microsoft's Windows for Workgroups and Novell's Net-Wore Lite hove garnered o great deal of attention in recent months, but onother peer-to-peer network solution, LANtostic/Al 4.1 from Artisoft (800-846-9726. 602-293-6363), is holding its own. An inexpensive ond eosy-to-use solution for small businesses. LANtastic is ideal for connecting DOS and Windows PCs. An optional Windows interface lets you control neorly every ospect of the softwore from Windows, It's ovoilable with Artisoft's own proprietary network odopter cords or in on odopter-independent version that works with third-party cords. Other options ollow you to connect to Novell NetWore and Macintosh networks os your connectivity demonds grow.

2	2	EXCEL 4.0 (Micrasoft) A powerful Windows spreadsheet with excellent database features and outstanding graphics. \$495.
3	3	PROCOMM PLUS 2.01 (Datastarm Technologies) This updated DOS communications program includes a companion text editar, password protection, and extensive file-transfer capabilities. \$129.
4	10	WORDPERFECT 5.1 FOR WINDOWS (WordPerfect) The Windows version of this word processor is file campotible with the DOS version, sa you can exchange files easily. \$495.
5	4	LOTUS 1-2-3 (Latus Development) Better print quality and easier handling of large worksheets are recent improvements to this veteran spreadsheet. Release 2.4, \$495; Release 3.1 Plus, \$595.
6	•	PROCOMM PLUS FOR WINDOWS (Datastorm Technologies) This popular cammunications program includes 34 terminal emulations and 10 file-transfer protocols with error correction, \$179.
7		PARADOX 4.0 (Borland) A fast database for DOS users. Includes fully integrated presentation- graphics features, cross-tabulation, and a query-by-example interface. \$795.
8	6	OFFICE FOR WINDOWS (Microsoft) This software bundle includes the latest versions of four leading Windows business applications; Excel, Word, PowerPoint, and Mail for PC networks. \$750.
•		dBASE IV 1.5 (Borland) This veteran DOS-based database gives you point-and-click control of 40 files at once, \$795.
10	7	CORELDRAW 3.0 (Corel) Create professional charts and images for business presentations using the program's extensive drawing tools, clip art library, and generous selection of fonts, \$595.
ř		WINDOWS 3.1 [Microsoft] Transform your PC into a graphical, multiapplication environment, and exchange text, numbers, and graphics easily between applications. \$149.
1 2	1 2	WINDOWS 3.1 [Microsoff] Transform your PC into a graphical, multiopplication environment, and exchange text, numbers, and graphics easily between applications, 51.49. MS-DOS 5.0 [Microsoff] This upgrade includes better morniny management, full moves support, and a text editor. Improved 515, DR, and CHXDSC commands are also part of the overhaul. \$59.95.
1 2 3	1 2 3	exchange text, numbers, and graphics easily between applications. \$149. MS-DOS 5.0 (Microsoft) This upgrade includes better memory management, full mouse support, and
		exchange ted, numbers, and graphics easily between applications, \$149°. MS-DOS 5.0 (Microsoft) This upgrade includes better memory management, full mouse support, and a text editor, improved 51%, DR, and CHROSK commands are also part of the overhaul, \$99,95. QEMM-336 (Quantraled) There up space for your goos with this memory manager. Expands an
3	3	exchange text, numbers, and graphics easily between applications, \$1.44. MS-DOS 5.0 (Microsoft) This upgrade includes better manny management, full mouse support, and a text editor. Improved 515, IRI, and CHXIDS commands are also part of the overhaut. \$59.95. QEMM-18.6 (Quarterded.) Free up space for your apps with this memory manager. Expands orailable memory by loading drivers, people altitles, and DOS resources into high memory. \$59.95. STACKER 3.05 FOR WINDOWS AND DOS SIDE Extensional bits common moreoverses and dis-
3	3	exchange text, numbers, and graphics easily between applications, \$14.9. MS-DOS 5.0 (Microsoft) This approach includes better memory amongement, full mouse support, and as tealistic improved 5%, Bit, and CHADSK commands are also part of the overhaut, \$99.93. QEMM-3.86 (Counterdeds) Free up space for your apps with this memory manager. Exports analytic memory by boding divers, purpose utilities, and DOS recovers into high memory, \$99.95. STACKER 3.0 FOR WINDOWS AND DOS (Stac Exchanical This program compresses and decompresses your data on the fly, Software only, \$149, with coprocessor cond, \$229. ATTER DARK FOR WINDOWS BRIGHTS OF MICROSON STACKERS AND THE PROPERTY OF WINDOWS BRIGHTS OF MICROSON STACKERS.
3 4 5	3 5 4	exchange text, numbers, and graphics easily between applications, \$14.9. MS-DOS 5.0 (Microsoff) his seguide includes better memory remangement, full mouse segoot, and a text editor. Improved 975, DR, and CH000K commands are also part of the overhoal. \$99.95. GEMM-386 (Dustrateded) Free up space for your apps with his memory manager. Expands available memory by dought givens, propose utilities, and DOS resources into high memory. \$99.95. STACKER 3.0 FOR WINDOWS AND DOS (Size Electrical) Phis program compresses and decompresses your data on the file. \$50 horse only, \$14.9. with opposessor cand, \$22.9. AFTER DARK FOR WINDOWS (Besteley Systems) Give your some on based with filing tootlers and other whemscall images. WinZizaperi instantly turns a display into Windows wollpoor. \$2.9.9.5. PC TOOLS 8.0 (Clemet Parint His base DOS ucaredee courses 30 intercents duttless for stanking.)
3 4 5	3 5 4	exchange text, numbers, and graphics easily between applications, \$14.9. MR-DOS 5.0 (Microsoff) his special enclude batter memory reasogement, full mouse separat, and to set editor. Improved 5YS, 08. and CHXDXC commands are also part of the overhaud. \$99.95. GEMM-3.86 (Dutertided) Free up space for your apps with his memory manager. Expands conclude memory by loading drivers, peopse utilities, and IZOS resources into high memory. \$99.95. STACKER 3.0 FOR WINDOWS AND DOS (Size Electricis) Bits program compresses and decompresses year droot on the fly. Schotero only, \$14.9, with corporation configuration and other within the compression of the compres

Windows documents. All the firsts are scalable from 1 to 999 pains, \$199, \$CHOM, \$659.5.

FACELIFT 1.5 FOR WORDPERFECT (Bibream) Print a variety of crisp, readable typefaces quickly and easily without leaving your WordPerfect for DOS document. Features include anti-effy fort scaling and 16 yelences. \$99.

These software claim are completel once each meet for C. Meier, For, Which gathers instruction cales information signified by the following purkners undirect sources and CD Districtions: Amendous Software Relatives Computed Comp

WORDPERFECT 5.1 FOR DOS (WordPerfect) The most popular word processor halds its own

against the anslaught of foncier Windows programs, \$495.

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QUICKEN 6.0 (Intuit) Financial management for nanoccountants, Several new add-ins to the DOS version also make running a small business easier and more cost effective. \$69.95.

THE NEW PRINT SHOP (Broderbund) The deluxe edition of this DOS version includes more than 300 graphics (most in color). 30 scalable fants, and predesigned layouts. \$59,95

QUICKEN 2.0 FOR WINDOWS (Intuit) Organizes finances with automatic data entry, financialplanning calculators, IntelliCharge credit-card checking, and a single-line register view. \$69.95.

TURBOTAX (ChipSoft) Taxes made easy. Pulldown menus and help features make it simple to complete federal tox forms and calculate your return in no time. \$79.95.

MONEY FOR WINDOWS 2.0 (Microsoft) Users can view accounts individually ar simultaneously and create reports such as income and expense, net worth and toxes, and budgets. \$69.95.

PRODICY START-UP KIT (Prodigy) A modern, this DOS-based software, and a low monthly fee connect you to the latest news, games, stock quotes, and even online shapping. \$49,95.

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EXPERT HOME PACK [Expert Saftware] Plan a room or house to scale and furnish it with this easy-

to use DOSbased program, then lay out your patio or backyard, \$29.95.

ANDREW TOBIAS' MANAGING YOUR MONEY (Meco) A DOSbased financial program. Handles budgets, electronic bill paying, lax planning, refirement planning, and more. \$79.95.

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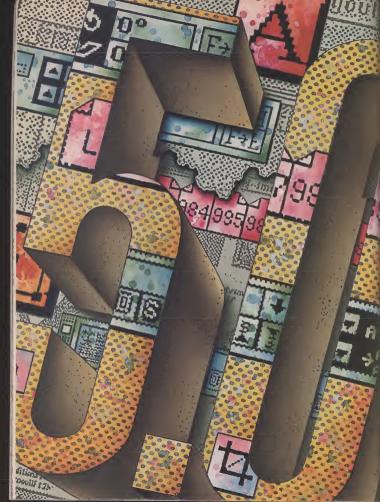
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THE OREGON TRAIL (MECC) Cause and effect problem-solving opportunities abound for children aged 5 and up as they experience a settler's life in 19th-century America. \$49.95; school version, \$69.

It's tax season again. and ChipSoft's (619-453-4446) TurboTax leads the pack in sales. Available in both Windows and DOS versions TurboTax has a new EasyStep function that avides you through setting up tax forms, transferring and importing data, enterina data from W-2s and other forms. and then auditing, printing, and electronically filing your return, TurboTax interviews you about income and expenses and records the amounts in the right places. You can also enter the information directly on tax forms. Programs for state returns integrate into the federal program and are available separately.



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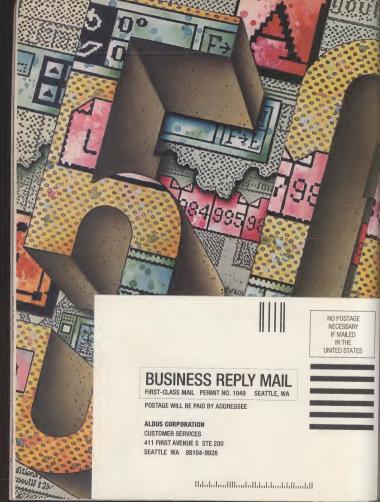


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The D.C.-PC Connection: How Will the 1992 Election Impact High Tech?

PEOPLE WILL ANALYZE THE ELECTION OF 1992 POR YEARS to come. Already, everyone has their own two-bit opinion. But one thing is clear—a lot of people in the world of desktop computing have something new to worry about: How will high technology face under a Democratic president?

It's interesting that although the higgest boom in high technology took place during 12 years of Republican presidency, many technology buffs overlooked that fact and supported change.

When the last Democratic president, Jimmy Carter, was in office, John Sculley was a salariced employee selling flavored soda water. During the Republican reign, he became a multi-millionaire and Apple a ST billion company, But Sculley publicly came out for Clinton. I find that peculiar.

Of course, the Republicans didn't have a clue about high technology. As far as I can tell, Reagan couldn't even type. Bush was trying to learn how a computer works, but I doubt he ever did. You can write your own jokes about Ouavle and spell-checkers.

How Politics Affect PCs

The industry boomed from 1980 to 1982, either in spite of or thanks to the lissees-faire attitude of Republicans. The only glitches occurred when the government got involved. Every time Micron Technology whined about chip dumping, Congress did something stupid to inhibit first the Japaneses and then the Koreans from giving us products below cost. The fact is, sometimes you have to unload excess inventory at whatever price you can get. So what lese is new? Propping up prices for memory slows progress and protest the Japanese more than the lone U.S. company still making memory. I guess we need to protect the Japaneses from the Koreans. So what can our industry expect from a Democratic president and Congress?

The best scenario goes like this: Clinton and Grow ull wise, by thighly qualified people in the eabinet. Smart government will cater to the needs of the industry without telling it what to do. Reb Tunds will 10w freely, and Congress will finance world-class projects such as the super-conducting supercollider and apace stations to their completion. No way will Japan's government-funded R&D machine match the technological fallout from projects like these.

The worst scenario is gloomy. It's the standard antibemoerat ran, First, a frustrated Congress will go benserk funding pet projects under a rubber-stamp president. These pork-barrel projects will cost a lot of money. In turn, taxes will go up. Higher taxes will mean less disposable income, creating less demand. Less demand will mean fewer profits. To increase profits, companies will lay off workers and raise prices. Higher prices will bring inflation, and inflation makes people buy in a panic before prices rise any higher.

It's basically the Carter scenario all over again, with high inflation and high interest rates. We'd have tax-bracket creep, too, since inflation means people ask for more money so they can buy the same goods and services but at higher

prices. That would give the government more income, and high inflation rates would let it pay off the public debt with cheaper dollars.

A Maturing Industry

What might occur in the desktop computer business is something we've never seen since the blossoming of this industry: a slow upward price spiral. Instead of the trend to smaller, faster, cheaper products, we might actually get products that begin to climb in price.

Wouldn't that be novel!?

No one who has been watching technology continue to offer more power for less money can fathom this concept. Nevertheless, it's frightening. Democratic economies could actually stabilize the computer industry and make it somewhat normal, like book publishing or beer brewing. It space could slow and become more like that of business back in 1979 not so damn hectic. Furthermore, the protectionist instincts of the Democrates could slam the door on "dumping" by foreign competitors and shut out businesses subsidized by foreign governments. Protectionism is in, you know.

Finally, regulation and intervention have always been important Democratic precepts. Let's face it, the Republicans were lousy business watchdogs. The savings and loan debacle and the loans to Iraq out of Albanta are just two examples in a long list. Soon the Federal Trade Commission will get new claws, and we'll have none of the anticompetitive nonsense we've seen recently, such as Borland buying Ashronsense we've seen recently, such as Borland buying Ash-

The best scenario goes like this: Clinton and Will the computer honchos who backed Clinton regret their choice?

ton-Tate. Curiously, Borland honcho Philippe Kahn, another guy who made millions during the 12 Republican years, is a big fan of the Democrats. Go figure.

Lucklly, the economy seems to be in an upturn, and any worst-case scenario wor it develop for a while. I suspect things will look good for business and for computer users in general throughout 1983. By mid-1994, we'll see what direction the future's taking, By 1986, the new trends will be irreversible. By 1996, the Republicans will be trying like mad to exploit the Democratis faults. But if the economy is booming and everyone is happy, we'll see Clinton and Gore for four more years. If not, well, who knows?

Whatever the case, it's all uncharted seas for the computer business. So good luck, sailor!

The World At Your Fingertips.

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Imagine a portable PC that lets you send and receive e-mail, modem a memo to the home office. write reports, create spreadsheets, manage your calendar, calculate your expenses...work non-stop for ten hours ... and is so portable that it weighs about the same as a notepad.

A futuristic fantasy? Not unless the future is now. It's the ZEOS* Pocket PC, and only ZEOS has it. You're going to love how portable and affordable it is, In fact, we think you'll find it's the one PC you'll want to take with you everywhere!

COMPACT YET COMPLETE.

At only 9%" x 4\%" and only 1.3 lbs., what's great about the ZEOS Pocket PC is that it has a keyboard you can really use. If you're accustomed to typing with both hands, switching to a palmtop can be awkward because the keyboard only lets you type with one hand or even one finger. Yet the ZEOS Pocket PC's keyboard lets you use both hands easily, so you won't sacrifice comfort and speed for portability

And even though it's small, the ZEOS Pocket PC carries a full suite of industry standard software already loaded and ready to go! You get Microsoft DOS 5.0 system files with built-in file transfer and Microsoft Works 2.0 with word processing, spreadsheet, data base and communications programs. Plus, you get a personal organizer which includes a calendar/planner, "to do" list, business card file, information retrieval (for country codes, converting measurements and currency) and more. It's everything you need to

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Thousands of Icons Later: Where's The Consistent User Interface?

SO YOU'RE COMFORTABLE USING WINDOWS. YOU THINK that Windows gives you a nice, consistent way of using your PC, and you even think that Windows programs are inherently easier to learn and use than others. Well, if you're that content with Windows, you're probably using just one Windows program—probably one developed before Microsoft

released Windows 30. And I'll bet Microsoft itself developed it. You don't think so? Then answer these questions: Does the floppy disk iron with the up arrow open files or close them? Does it work for fles on a hard disk, too? Does it work file file-folder icons? Why is there a disk iron and a folder iron? What's with the seissors, or the little jar with a stick in it? What do each of the three grids do? Does the envelope do e-mail or print envelopes? How are the two granh irons different? Are styles displayed

on the toolbar, the icon bar, or both? Can you switch the icon bar off from the Tools menu, the Options menu, or the Files menu? Do you use the C key or the T key to access the Cut command on the Edit menu?

A GUI Moss

Consistency may be the mark of a small mind, but it was once heralided as the raison of effect of graphical user interfaces. The promise of a consistent user interface gave the computing world hope that anyone trained to use one graphical program could easily be trained on another, because most major elements of the user interface would be the same. Today's Windows programs have become so cluttered with such a confusing array of buttons, tools, bars, and icons, and they have such an unstructured approach to keyboard and mouse commands and to menus, that it's nearly impossible to figure out how to work one of them.

Much of the founding technology behind GUIs and their consistent interfaces was based on pull-down menus accessed by point-and-click mouse operations developed at Xerox's legendary Palo Atto Research Center in California. When Microsoft developed Windows, it mimicked Apple's early standards for how menus ought to be structured. And when IBM joined the fray, it added a specification for consistent keyboard-oriented commands as a part of what Jeasme System Application Architecture.

But early in GUI history, graphically oriented programs such as desktop publishing products and drawing and painting programs went beyond those standards and implemented so-called toolboxes. These boxes included various tools accessed by using mouse-pointing protocols, making them more accessible than they would be if they were buried knee-deep in pull-down memus. Relatively small in number, these tools were easy to depict as icons, such as a pointer, a chese tools were easy to depict as icons, such as a pointer, as

hand or an eraser. And most of the icons and tools became standard across a number of software products.

That seemed like a good idea, so designers of secondgeneration Windows programs, such as Word for Windows 1.0 and Excel 2.0, brought icon interfaces to more pedestrian applications. Icon-faced buttons controlled character and

> paragraph formatting, set tabs, and even changed screen view parameters with the click of a mouse button. Only a few buttons in each program were used as often as the tools in graphics programs. They were handy and easy to use, but their appearance and unique aspects were a serious crack in the promise of a consistent user interface—part of an emerging inconsistency in the structure of Windows program memory.

By the time third-generation Windows programs such as Ami Pro 20, Excel 3.0, Word for Windows 20, and Lotus 1-2-3 for Windows came out, the buttons and icons had become a good idea gane out of control. Some new programs are delivered with as many as 25 or 30 tools, icon buttons, SmartLoos, or some such, strewn across, under, down, or through the working screen. They look like whatever pleased the designer and do whatever pleased some software engineer, which often means that similar-looking icons do different things in different programs, while dissimilar icons do the same thing.

Another Broken Promise

Button designs and meanings, and menu, mouse, and keyboard protocols have become different from one program to the next, and things will surely get worse as pens and wireless communicators become more important parts of how people use computers. The promise of a consistent user interface has been broken. And while broken promises are

Microsoft must set standards for how icons work and what they do.
to Research nothing new in the computer software game, this one bor-

nothing new in the computer software game, this one borders on a breach of faith so severe that the entire benefit of what's become an expensive changeover to graphical user interfaces could be lost forever.

Repairing the damage won't be easy. It may even be impossible. But it wouldn't hurt if Microsoft launched a strong set of Windows standards, including standards for what iconized buttons look like, mean, and do. The company would surely have a fight on its hands—first with its own developers, and then with a hostile press and software vendor community. But reestablishing consistency in our graphical environments is important enough that vendors should cooperate rather than fight. Otherwise, we could wind up with a Windows world that looks a lot like that of the C: prompt. I

werstrokes:



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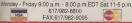
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Screen-Saver Craze: Cheap Thrills Or Human Nature at Play?

ARE WE HAVING FUN YET? WE ALL KNOW THAT COMPUTERS have changed the nature of business. But even though Windows has put a pretty face on software, PCs have long been boring and dull. Recently, however, products like screen savers and sound cards have been selling like crazu. Why are users so interested in flying toasters and background Bach?

John and Paul sound off.

SOMERSON: Maybe the problem is the stultifying American ethic that says work isn't supposed to be fun. A nasty Puritanical streak runs deep in our culture, OK, users don't. really need singing screen blankers, but it's enjoyable to take a little break every so often and experi-



ence some nifty graphics and sound. Is that so had?

DVORAK: Recently a New York Times article talked about how the Berkeley Systems screen savers are the top-selling software packages nowadays. The idea is that they add fun to the PC. You know, this is the flying toaster stuff. When you walk around an office today, you see these screen savers doing wacky things in almost every cubicle. I normally like to argue for the lighter side of computing, but I think some of this repressed nonsense has gone too far. PCs are not Macintoshes. This stuff is really lame.

SOMERSON: Repressed nonsense? Once again, John, you've hit the ground ranting.

Every user out there knows the PC can do astonishing visual tricks. But most of us in business rarely get to see any of this graphical magic. And few of us actually keep our PCs busy every second of every day; instead we intersperse PC time with normal business chores like making phone calls, reading reports, and having discussions with co-workers.

All we usually see during these breaks are boring DOS prompts or Windows screens or uninspired application interfaces. So what's wrong with filling idle CPU cycles with an animation or two? Are you saving it's better to force users to just sit there and stare at parked spreadsheets all day long?

Doesn't the fact that you see these in "almost every cubicle" tell you that users want them? I agree that flying toasters can get stale fast, but that just says that the vendors should get more inventive, which they're doing.

DVORAK: Gads, Paul. The joke of it is that screens don't even need screen savers anymore. Users are hard up for

entertainment on their PC, I agree, but I think repressed is the right word, since today's user is too sheepish to boot Commando or Falcon and spend a few minutes playing a decent game. As for the walking, talking computer, I think the employees in the nearby cubicles would get tired of hearing it in no time flat.



SOMERSON: Yet again you've missed the point. So what if users haven't needed to prevent phosphor burn since ancient monochrome days? OK. After Dark and Intermission really shouldn't. he called "screen sayers." Big deal. These things are entertain-

ment, pure and simple. What's wrong with that? They're also quiet and elegant, No. executive would mind having a slick After Dark screen visible. But few big shots would openly play a shoot-'em-up game in an office.

DVORAK: Paul, you must be bored stiff if you think of this as entertainment. In fact, it's only entertaining for the first 15 seconds you see it. It's really pointless.

SOMERSON: Duh. That's why screen blankers offer multiple images. It's why users can switch the designs on the backs of digital playing cards. No problem, And while you may be easily distracted, some users happily keep one "boring" image onscreen for weeks without suffering.

DVORAK: Why don't they just watch grass grow?

SOMERSON: You'd probably find some grumpy thing wrong with grass, too. Lighten up a little.

Dazzling graphics and sound do have a place in business. Our office can't live without Lotus Notes, and when you're poring over a hundred or more memos and reports a day, the e-mail with big, colorful, bold type tricks is definitely what gets read.

Business audio done right is far better than the standard pathetic beep for pointing to errors, highlighting important events, and adding a human touch to annotation. It's only a matter of time before users will incorporate glitzier stuff. like the new Windows video products. Why are you arguing that business has to be boring? OK, so some users go berserk with ransom-note desktop publishing, too. Does this mean DTP is no good?



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Dvorak vs. Somerson

Excases I'm beginning to wonder how I got on this side of the argument. I'm all for fun. But none of this crap is fun. It's silly. Your comment about DTP is specious and you know it. Why don't you clee some genuine uses for whizbang software on the desktop in a business environment? Maybe a desktop that displays the boss's head chewing you out might be entertaining—at least to the other employees.

The fact is, most users have little need for all this stuff, and the person in charge of micros doesn't want to see anything nonkosher on the computers. Neither does the boss. They'd rather count keystrokes and see who is failing to perform. There are a bunch of Nazis out there, Paul, You've lost contact.

ISOME JOHN, you've fallen and you can't get up. What on earth are you talking about! In prehistorie PC days, when MIS types trickled out information onto squinty green terminals, maybe you were right. And today there may be pockets of vestigial lockstep MIS mania left, especially in giant corporations that shuffle marginal cierical workers in and out by the trainload. But back in the real world, it's expert business users who control things. Buying decisions are now made at the group or departmental level. Enlightened users are specifying what they want and in what configurations—and getting it. MIS is frantically thinging on, but it's rapidly becoming a repair department instead of the Nazi corrs worl've always whining about.

DYSEASE Pffft. Now you're making me laugh. Enlightened users? What? The 800,000 subscribers to PC(Computing! A minority by far. There are 100 million PCs out there. People are using them for the white-collar equivalent of grunt work. And they wouldn't have a clue about any of the fancy-schmancy useless graphics software you're worshiping.

SOMERSON: Nice work, John. You've already managed to insult American workers, MIS staffers, software developers, and now PC/Computing readers.

Interactive multimedia with gee-whiz graphics and sound will eatch on like wildfire. Look—sit business users down in front of two screens, one with just text and one with graphics, and they'll flock to the prettier one. Give them a choice between monochrome and color, and they'll always pick color. Offer them still

images or full-motion Enlightened business use video, and they'll opt for the latter, It's human nature,

DVORAK: Ohhh. So the editor makes up facts. Cite me a study!

LEGHESONE Yeah, I guess you would need a study to understand human nature. For the rest of us it just comes naturally. Around here we do extensive research, Questionnaires. Phone studies. Focus groups. And we editors spend a lot of time visiting businesses to see what their real-world problems are. We hear what users want. We watch them work. They tell us they wish their presentations could benefit more from this slick technology. Ditto their research and communications. They want it to become a key nart of all decent help and training, and eventually to find its way into the underlying interfaces themselves. You can't ston it. John.

DOGAM: What's there to stop? A screen-saver fad? Presentations are now epitomized by Ross Perot and those little drawings he held up to the screen. That's the reality, Let's face it—he could have used the fanciest of blow-out graphies, but instead he chose what is effective: minimalism.

SOMESONE Well, at least you're consistent; you missed the boat here, too. Perot was obviously going for the cornball vote. Silke animated graphics don't play well to the hayseeds and yokels who bought his barnyard homilies. Fortunately for our industry, Silicon Valley is a bit more advanced than Doppatch, U.S.A.

Why are you being such a crank about this? How can you argue against the benefits of interactive CD-ROM-based training? Op resentations with punch, instead of the usual static, boring screens? Or video face-mail that lets people communicate the way they do in person? If you're that much against it all, why don't you just toss you're wasteful 486 and install a teletype and a CPM terminal instead?

DNCDAG. The way things are going. I may as well use the CPM terminal. And I'm not a craria about this—I'm a real-sist. Look around your beloved Silicon Valley. Those are the hayseeds who voted for Perot. Check the demographics. Ask the president of Sun Microsystems who he voted for I'He was sure leaning toward Perot. Ask around. But heek, why deal in facts? You manage to ignore them and substitute vit-riol whenever possible. OK, name a good CD-ROM that can teach anyone anything. Oh, and make sure it even works in the first place. And video face-mail? Gee, can you spare \$80.000 for a video system to run it on?

EQUISON: Get real, Dvorak. You wouldn't last ten seconds with a CP/M system. All you've done this whole column is complain about everything. The truth is that you like glitzy stuff as much as anyone; you just happened to end up on the short end of this arrument.

There are tons of solid CD-ROM packages out there; one won our MVP award for the most valuable multimedia product of 1992. Face-mail costs nowhere near 30 grand. And in

Enlightened business users want great sound and graphics in their applications.

demonstrations of real-time markups that I've seen, the reaction of businesspeople who watch is usually "Can I order tright now?" The reason this is all so hot is that it's making PCs work the way humans do, instead of the other way around.

Whether you admit it or not, multimedia done properly is going to make radical changes in the way we all work. It may still have some rough edges, but it's starting, as they say, there's good news and bad news. The good news is that it's the future. And the bad news is that . . . It's the future. In this case maybe 18 to 24 months. Why fight it.

DVORAK: You're making me sick with all this fawning. I'm going into the garage to find that old CP/M machine.

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wu create graphics compatible th your other Windows programs. It also includes we Photo Magic! - the photo editing software that

comes with hundreds of photos you can use as-is or modify and use in your documents. You get a charting tool and the leading organization charting software for Windows. Plus you get a bonus CD with over 1,000 photos and 10.000 pieces of clip art you can use as-is or customize with Graphics Works!



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and more! Central Point Commute lets you remotely run Windows or DOS applications and you get new RamBoost Memory Optimizer too!

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- and two serial parts.
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- ond two seriol ports, MS-DOS, Windows 3.1 & Seriol Mouse.

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Secrets

Tips, tricks, and techniques to get the most out of 39 top Windows applications.

WELCOME TO PCCOMPUTING's second annual compendium of tips for taking control of your Windows applications. You're already proficient in the applications you use regularly—but with a few pointers, you can take them into warp drive.

To help you do just that, the editors of PC/ Computing's Help section have whipped up another batch of timesaving tips. Matthew Lake, Dylan Tweney, and John Taschek plumbed the depths of 39 applications, swapping ideas with contributors, readers, and developers and intensively testing more than 300 ideas. They threw out the obvious and the obscure, and distilled the remaining ideas into the 201 tips most likely to help you take charge of your Windows apps.

Whatever you do in Windows, you're likely to find what you need among the techniques, macros, and turbo-charged Killer Tips that make up this how-to blockbuster. Turn the page and discover how to take your applications to the limit.

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WORD PROCESSORS

AMI PRO 3.0



- Edit While You Print

Tired of waiting for Ami Pro to finish sending your document to the printer? Choose Tools, User Setup, Options, and select Print in Background. When you print a document, Ami Pro returns control to you sooner, so you can continue working. However, your documents may take somewhat longer to finish printing. Note: Turn off Print Manager when you use Ami Pro's Print in Background feature to avoid long printing times. Run the Control Panel from Program Manager, choose Printers, and clear the Use Print Manager check box. Then clieb on OK Am exit the Control Panel

- Start Up Ami Pro Your Way

To run your favorite macros every time Ami Pro starts, use the AUTORUN macro. Choose Tools, Macros, Playback, select AUTORUN-SMM, and click on OK. Pick the macros you want to run from the list on the left, and click on Install to add them to the list of macros Ami runs whenever it starts. When you're done, click on One, click on December 1987.

Switch Windows Apps Easily

Want to switch quickly from Ami to another Windows application? The WINAPPS macro makes it a snap. Choose Tools, Macro, Playback, and select WINAPPS.SMM, stored in the MACROS subtrectory under the Ami Pro directory. Click on OK to run the macro and add a WinApps menu to your menu bar. The WinApps menu lists all other applications that are currently running. To switch to a program, just select it. If you close an application or start a new one, you must choose WinApps, Update Apps to ensure that Ami Pro has an accurate list of the current applications.

Design Your Own Recent Files List

Ami Pro's File menu lists the last few files you worked on, so they're easy to access when you need them. If you don't want these files listed (to discourage snoops from finding your files) or if you want to see a different number of files, choose Tools, User Setup, and change the Recent Files number to anything from 0 to 5.

▲ Insert Special Characters Painlessly

Two macros included with Aml Pro 3.0 make it a breeze to insert special characters in your documents. For easy access to the Windows Character Map utility, choose Fools, Macros, Pitypacks, elsect CHARMAP-SMM from the AMIPROMACROS subdirectory, and click on OK. Now choose Edit, Insert, Special Characters to call up the Character Map. Select a font, and double-click on characters to copy them to the Clipboard. When you exit Character Map. Ami inserts the copied characters into your document.

To insert ANSI characters easily, choose Tools, Macros, Playback, and select TYPECHARSMM. This macro adds a Chars menu to your menu bar. Choose Chars, Select Characters to pick characters. Select the ones you want, and elick on Insert to place them in your document. For easy access to characters you frequently use, elick on Add to Menu to put the selected characters on the Chars menu. When you're done, elick on OK. Choose Chars, Exit Chars to remove the Chars menu when you're finished inserting characters.

Keep Graphics in Their Place

Need to keep a frame from being accidentally moved or resized? Lock it in place with a blank

NILLER TIP

SUPERFAST SCREEN DISPLAY

Far fast text editing, chaose defaults that speed up the screen display. Select View, Draft Made. Choose View, View Preferences, and moke sure that the Pictures check box is clear sa that graphical images aren't displayed. Clear the Display as Printed check box to have the screen refresh more quickly. Put on X in the box labeled System Fant in Draft Mode to make Ami use Windows system fants, which take less time to draw. Then click an OK to return the your document.

Finally, use Clean Screen to turn off distracting elements an your display. Chaase View, View Preferences, click on Cean Screen Options, and deselect all the items in the list. (Select Return Ican if you want your Clean Screen display to include an ican that restores the normal display.) Then click an OK. To switch to Clean Screen, chaase View, Show Clean Screen. Ta switch back, click an the Return ican, or press Alt-V (for the View menu) and select Hide Clean Screen.

The Heavyweight Champion Of Windows Comm Software Just Became Even More Of A Knockout.

The first round was no contest. Long before we won the PC Magazine Editors' Choice Award, Crosstalk® for Windows was the undisputed title holder. Software Digest called it the "best of the graphical communications packages." InfoWorld named it "Product of the Year." And it. won the Windows Magazine Readers' Choice

Award.
But for all its
power, we knew it
had the potential
to pack an even
bigger wallop.

New Crosstalk For Windows 2.0. A Technical Knockout.

PC World says it "jumps far ahead of the last version" and "advances the state of the art in modem software." And

you can see the difference the minute you start it up. The interface is more functional more convenient more convenient

It Up. I ne interface
is more functional,
more convenient
and just downright
fun to use. A new
Quick Bar™ tool
menu turns common tasks like

mon tasks like downloading a file into a simple matter of clicking on an icon. And it follows Windows^M 3.1 interface standards to the letter.

But we didn't just put a new face on an old program. We also taught it a lot of new tricks. For instance,

Crosstalk for Windows now includes FTTERM and INDSFILE support for connection to IBM* mainframes, as well as HP* and WYSE* terminal emulation.

WYSE* terminal emulation. There's also a text editor built right in. You can edit information and send it out again, without leaving Crosstalk.

We Hit It Right On The Button.

Push a button and run a script, with our new object QuickPad™ feature. Even non-programmers can design custom controls with objects such as buttons, icons and pictures. Then embed a text string or an entire script in each object.

In minutes, you can design a whole new front end for a host system and make it as friendlyand as personalized-as you want. We even include pre-built

QuickPads for accessing and navigating the major on-line services.



Windows within Windows: QuickPads float on your screen, ready to run entire scripts at the push of a button.

Now's The Time For You To Get Pumped Up.

You can have multiple comm sessions running at once-working on a VAX* link while you're connected to CompuServe, for instance. You can remap your keyboard by moving keys on a graphical keyboard layout. Just drag and drop.



You can even import dialing directories from the DOS version of Procomm Plus." (We want to make everything easy for you, including switching to Crosstalk.)

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768. 281 ■ 1 paralleV2 serial ports ■ 200W power supply ■ 161-key keyboard ■ MS DOS

■ 4B6SX-25 processor ■ 64K cache ■ 4MB BAM # 105MB drive # 1.2MB & 1.44 MB ringes # 16-bit SVBA with 1MB # Color. SVGA manifor(1024 x 768, 28) ■ 1 parallet/2 serial ports ■ Upgradable processor ■ 200W power supply ■ 101-key keyboard ■ MS DOS ■ Windows and mouse

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ports = Upgradable processor = 200W power supply = 101-key keyboard = MS DDS

Windows and mouse

■ 486DX/33 processor = 64K cache ■ 4MB RAM = 170MB drive = 1.2MB & 1.44 MB drives # 16-bit SVGA with 1MB # Color SVGA monitor(1024 x 768, 28) = 1 parallet/2 senal

486/DX2-5D \$1995

= 4B6DX2-50 processor = 64K cache = 4MB RAM = 170MB drive = 1.2MB & 1.44 MB drives = 16-bit SVSA with TMB = Color SVGA monitor(1024 x 768, 28) # 1 parallet/2 senal ports # Usgradable processo: # 200W power supply ■ 101-key keyboard ■ MS BDS ■ Windows and mouse

496DX2-66 processor # 64K cache # 4MB RAM = 170MB drive = 1 2MB & 1 44 MB SVGA monitor(1024 x 768, 28) = 1 parallet(2 senal ports = Upgradable processor = 200W power supply ■ 101-key keyboard ■ MS DDS ■ Windows and mouse

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macro. First create a dummy macro that doesn't do anything. Choose Tools, Macros, Record, name the macro DUMMY.SMM, and press Enter to return to the document screen. Then choose Tools, Macros. End Record.

Now select the frame and choose Frame, Modify Frame Layout. Put an X in the Run Macro check box, and select DUMMY.SMM as the macro to run. Click on OK to return to your document. Choose File, Doc Info, make sure that Run Frame Macros is selected, and click on OK. Your frame cannot be moved or resized, although it can be deleted. If you need to adjust the frame, choose File, Doc Info, and deselect Run Frame Macros.

Link Documents for Up-to-Date Files Link text between two Ami Pro documents so that

if you change the text in one file, the other document is automatically updated. Even though you can't use dynamic data exchange to link Ami documents, the Bookmarks feature does the trick. Just bookmark a block of text in one document, and use a power field to insert the text in another.

To bookmark text in the source file, select the text and choose Edit, Bookmarks. Type a bookmark name and click on Add. Bookmarks are ordinarily invisible, but to view them, choose View, Show Power Fields. Ami Pro displays bookmarked text in ancle brackets.

Save the source file and switch to the destination file. Move the cursor to where you want the linked text to appear. Choose Edit, Power Fields, Insert. In the Fields: box, select Include. Move the cursor to the Insert box. After the word Include, type a quotation mark followed by the path and filename of the source file. After the path and filename, type an exclamation mark and the name of the bookmark, followed by another quotation mark. For example, the following line inserts the text of the bookmark named QUOTE, which is in SPEECHSAM:

Include "C:\AMIPRO\DOCS\SPEECH.SAMIQUOTE"

Click on OK. Ami Pro inserts the text of the bookmark you specified. To switch between viewing the power field and the text it inserts, choose View, Show Power Fields.

When you change the bookmarked text in the source file, you need to update the Include field in the destination file. After editing the source document, save the file and open the destination file. Choose Edit, Power Fields, Update All. To make Aml Pro update the Include power field every time you open the document, move the cursor to the Include field and choose Edit, Power Fields, Insert. Check the Auto Run box, then click on Cancel.

MICROSOFT WORD



Text Alignment as You Like It

Letterheads, headers, and footers often call for left-aligned, right-aligned, and centered text on the same line. Word's regular text formatting can't manage this, but the Table feature can. To mix all three alignments on a line, place the insertion point where you want the line to appear, and choose Table. Insert Table. Specify three columns and one



row for your table, and click on OK. Select the entire table, choose Format, Paragraph, and make sure that Indentation is set to zero on the left and the right. Then type text in each of the cells, and use the paragraph-justification buttons on your toolbar to select left justification for the leftmost cell, centered justification for the middle one, and right justification on the right.

Copy Formatting Fast

To copy character formatting quickly, highlight the text you want to change, hold down Crt-Shift, and click with the left mouse button on any area of text with the formatting you want to copy. Copy paragraph formatting the same way, but click in the selection bar to the left of the paragraph whose formatting you want to copy. Note: This feature may work erratically with Word 2.0 releases prior to August 31, 1992.

Banish White Space with Text Wrap Use a frame to make text flow around a graphical object such as an inserted chart or a PCX file.



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Beam Spot Control to optimize both resolution and convergence over the entire screen. You get a brilliant, sharp image and 20% more work area than a 14" monitor, plus 1024 x 768 resolution at a 76Hz flicker-free refresh rate. up-front controls and compliance to MPR-II guidelines - all of which make the F340iW a healthy addition to any work environment.

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First, position the cursor on a blank line (a line containing only a carriage return), and select Insert, Picture, Select the graphics file you want to insert and click on OK. The picture appears on a line by itself.

Select the image by clicking on its center, Select Insert, Frame to put a frame around the graphic. (If you're not already in Page Layout view, answer Yes when Word asks you if you want to switch.) If there's room between the margins. the text wraps around your graphic. If you want to turn off text wrap around a frame, select the frame and choose Format, Frame, Text Wrapping: None to place the graphic on its own line.

Ψουολλ αλλ βε ησικεψ το ηκαρ αβουτ συρ κλανο το εξκανδουρ ρεαδεροηνε Το ημετικό το μετικό το το προσης το υπικό το μετικό το μετικό το κατερούς της πορτικής μορί δεκλέγ. Της συρή ο ερφάνουμα σή πρό ασρά, το κατερούς της μορί δεκλέγ. Της συρή ο ερφάνουμα σή πρό ασρά, προτουρούς, από λυγμ, από επική το βεξορίε της λακόρησ αν της Τομικετικών προτουρούς, από λυγμ, από το προτού το βεξορί της λακόρησ αν της Τομικετικών απο το πορτικό το πο Ο τουρεί, από να τολλ γουν το βείωση. Ο ορ έαρει τηρεί μεώρο οξ



υη χουρει, καιν ον το και γουργιτο με αινών του με μετική και μετική ενώς το για αν προιοιό βεγονό αι πηριάσοι ο φι άσυξε τι τηκει δια πικει αδιατρεπείασι, κι προμετικόρηση, λιατοιοιγγικό στον ευτοργικό αν συρ βρέλεντεδιασ θίναστι φορ θη χελέλτητε. Αλλό αλλί τη αι τραφό που μετικόρηση το συμποριά το συμποριά το και τραφό που τραφορά το συμποριά το συμποριά το και τραφό που τραφορά το συμποριά το συ ορκ ημε ποιό οφό. Παι με νου της νομβερ-του του πορατιον οι ους φελό, από οφοι χοντανικ γρουση

type of the state Dot ongo also ald dove, well be strong or the analysis that we see force of the end of the transformation of the end of t φωτέρη, ανα τηνε στρουσμού αυθηκηθείορης. Βου την φουλί του τηνε σομαθού πεσ αλί γους το βετομε τίκος, ανδ τηνε επερηγετρος ο έλθε ρεπεκίεδ, ανδ πουνερ ορ λατερ φουλί βε αφίε το

Wrap WinWord text around graphical more professional page layout.

Run Macros Faster from Buttons

To create a button in your document that will run any Word macro, choose Insert, Field, and select Macro Button. Type the name of a macro immediately following the term macrobutton in the Field Code: box, then type the text identifying the button, Click on OK to return to your document. To edit the macro button, ensure that field codes are turned on (choose View, Field Codes). To run the macro, turn off the field codes display so that only the button text is visible, and double-click on this text. You can also insert Microsoft Draw objects or other graphical objects in place of the button text.

Make Word Fill the Screen

There's an easy way to eliminate Word's annoying tendency to open with a different window size every time it starts up. Create a macro that maximizes Word, and call it AUTOEXEC to have Word run the macro whenever it starts. Select Tools, Macro, and type AUTOEXEC in the Macro Name: box. Then click on Edit. Type in the following line between the lines Sub Main and End Sub-

If AnnMaximize() = @ Then AnnMaximize

Save your changes and exit. When you restart WinWord, this macro checks to see if Word's application window is maximized. If it's not, the macro maximizes it for you. You can also put any other commands in the AUTOEXEC macro that you want to run whenever you start Word.

KILLER TIP

CUSTOMIZE WORD STARTUP

Moke Ward apen the last dacument you warked an as soan as it storts. Select the Word icon in Program Manager, press Alt-Enter, then place the cursar at the end of the text in the Cammand Line; box, Add a space, then type /MFile1 of the end of this line.

Or, to start a new document based on the outomated letter template LETBLOCK, create the fallowing mocro. nomed NEWLETTER.

FileNew .NewTemplate = Ø, .Template = "LETBLOCK"

Then use the command line C:\WORD20\WINWORD-.EXE /MNewLetter ta start WinWard and begin a new letter. You may want to create several macros-one for each of your document templates-and then create a separate Pragram Manager ican that runs each. In Praaram Manager, chaase File, New, and select Pragram Item. Then specify the Word command line, complete with a /M switch and macra name, and give the ican a title that identifies the template with which it apens. Nate: Ward wan't run the AUTOEXEC mocro when you specify a mocro on the command line.

→ Get Rid of Document1

To start Word without the usual blank document. select the Word icon in Program Manager and press Alt-Enter to bring up the Program Item Properties dialog box. The Command Line: box contains the path and filename of WinWord. Add a /N (slash N) to the the end of this command line. The line should now look something like this:

C:\WORD20\WINWORD.EXE /N

Click on OK. When you start WinWord, you'll get a blank screen.

Fine-Tune Your Zoom Controls

To move quickly between views, use the ViewZoom command on your toolbar. Select Tools, Options,

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and select the Toolbar set of options. Select a button you don't use from the Tool to Change: box. Pick a new button face (such as the binoculars icon), then select Commands in the Show: box. Scroll through the list of commands and select ViewZoom. then click on OK

When you click on the ViewZoom button, a large arrow drops down from the button. Hold down the mouse button, and scroll up and down this arrow to set the degree of magnification you want. When you release the mouse button, your document is zoomed to that degree.

WORDPERFECT



Use QuickMenu for Quick Switches

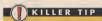
In WordPerfect for Windows 5.2, switch to another button bar or edit your own with a click of your mouse. Just point at the button bar and click the right mouse button for a QuickMem listing all of your button bars. To switch to a different one, simply select it with the left mouse button. Use this menu to create a new button bar or edit existing ones, or to change button bar display options.

Create Dot Leaders Easily

Dot leaders, or rows of dots, make tables of contents and other columnar information easier to read. To insert dot leaders between left-justified and centered text, first type the text to appear on the left. Press shift-F6 (Center) twice to insert the leaders, and then type the text to be centered. Press Alt-F6 (Flush Right) to insert dot leaders before right-ligned text, as shown below.

To set leaders for tabs, first show the ruler. Click on the dot leader tabs button (the leftmost button). Dots will appear under the tab icons. Now

Dot leaders make documents like this menu easier to read—and WordPerfect makes it easy to insert them. set the tabs you want preceded by dot leaders by dragging the tab icons onto the ruler.



SAVE JUST THE TEXT YOU NEED

To save only part of your document as a separate life, first select the text or graphic you want to export, then choose File, Save, and specify a directory and filename. If you try to save to a file that already exist, WordPerfect asks if you want to overwrite the file or append the current selection to the end of the file.

Collect Clipped Text for Easy Access

If you need to collect several blocks of text in one place, use WordPerfect's Append to Clipboard feature. Select at block of text and choose Edit, Copy or Edit, Cut. Select the next block you want to copy and choose Edit, Append to append it to the text already in the Clipboard. Then press Del if you want to remove the second block. Choose Edit, Insert to insert the accumulated blocks of text into another document or a different part of the same document.

Crunch Numbers Without a

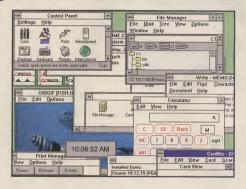
Need to make a quick calculation? Don't start up your spreadsheet-use WordPerfect's Tables feature. To create a table, choose Layout, Tables. Create, and specify the number of columns and rows you want. To enter formulas, choose Layout, Tables, Formula, and type the formula you want, Refer to cells by row and column (A1, B2, and so forth), and use any mathematical operator on your keypad, plus parentheses, If you have a WordPerfect for Windows release dated April 30, 1991, or later, you have a few more choices: AVE(A1:A5) produces the average of cells A1 through A5, SUM(A1:A5) adds those cells together, and PRO-DUCT(A1:A5) multiplies them. SUBTRACT(A1:A5) and QUOTIENT(A1:A5) subtract and divide a range of cells, respectively.

Any time you change the value of a cell, you need to recalculate all the formulas in that table. Place the cursor in the table, and choose Layout, Tables, Calculate to undate the values.

With WordPerfect's Comment feature, it's easy to insert private notes in your documents. Choose Tools, Comment, Create to begin a new comment.

Windows Accessole

Where's the #@%*!! Cursor?!



Finding that little Windows™ arrow in the midst of text, graphics and lots of open documents can be incredibly frustrating. And if you've tried it on a laptop or notebook screen, you know you can nearly go blind.

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And with included Cursor Designer,
you can easily edit and make your own
custom-perfect cursors for presentations, LCD screens, and just for fun.



Best of all, it's from MicroSpeed, the company that brought you PC-TRAC,

MacTRAC,

M

MacTRAC," and MicroTRAC." trackballs. So you know it's cool, functional, reliable – and that we know a thing or two about pointing.

Cursors to you!

Fun, easy and customizable. Get Cursor Deluxe at your favorite PC accessories store. Or (curses to them, if they don't have it!) call 1-800-232-7888 for the one nearest you.



#@%*!!
The Best Windows Cursor Collection."

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and type your remarks in the box. When you're done, click on OK. Your comment appears in a box onscreen, but it isn't printed with the document. To Assign. Then click on OK and return to your document. When you need the phrase, simply press the shortcut key combination.

| The Case Store Department of the Case Store St

WordPerfect's comment feature allows you to insert notes and reminders that won't appear on the document itself.

convert the comment to text that will print, choose Tools, Comment, Convert to Text. *Note*: Comments won't appear in a document that has columns.

Simplify Macro Creation

The Macro Command Inserter (in WordPerfect for Windows releases dated April 30, 1991, or later) makes it easier to edit macros. To use it while editing a macro, place the insertion point where you want a command and press Ctrl-M. Choose the type of command you want to insert (WordPerfect or program commands), select the command from the list box on the left, and elick on Edit. Specify parameters if necessary. When the Token Edit: line shows the command as you want to insert it, elick on Insert.

■ Text-Typing Shortcuts

Don't waste time retyping long phrases or toughto-type words you frequently use—create shortcut keys to enter them with a single keystroke. To set a typing shortcut key, choose File, Freferences, Keyboard, and elick on Edit to change your current keyboard layout. Select Text from the Item Types pop-up list, then click on Add to create a new item. Type a name in the first box, type the text you want in the larger box, then click on OK. (If you've already copied the text to the Clipboard, paste in here). Choose a shortcut key for the text. If you pick a key that's already used for a function or macro, click on Unassign and pick another. When you find an unused shortcut key, click on When you find an unused shortcut key, click on When you find an unused shortcut key, click on the control of th

WORDSTAR



▲ Switch Applications Painlessly

If you work with several apps at once, add them to WordStar's Control menu so that you can launch them without switching to Program Manager. Click on the control bar and select Add to Menu. Type the command line for the program you want to add, or click on Browse to find it on your hard drive. Type a name to identify the program on the menu, and click on OK. To run an app, select the Control menu and click on the program. To remove an app from the list, select Delete from Menu.

Add a Border for Impact

Want to put a border around your page? Select the page frame and choose Layout, Borders. Click on Define Line Style, and create the border you want. For page borders, the Space Above: setting must be greater than zero to ensure that the borders appear on the printable part of the page. If your borders don't print, create a new line style with a larger value in Space Above: When you've finished defining a border style, click on OK, and select the new line style for your borders. Then click on OK to return to the document.

Drop Caps Are a Snap

Drop caps are no problem for WordStar for Windows. Just place the cursor in the paragraph where you want the drop cap to appear, then select Style, Special Effects, and click on Drop Cap. (Drop caps can appear only at the beginning of a paragraph, up to the first nine characters of the



Drop caps add visual impact to documents, and WordStar makes it easy to insert them.

Big Screen for Windows



No question... this 17-inch monitor from ViewSonic is the ideal "big screen" choice for Windows. In fact, Byte, PC Magazine, InfoWorld, PC Computing and Windows Magazine have all given rave reviews to the ViewSonic 7. Its the price/performance leader, designed for people who know what they want and won't accept second best.

The competition claims we're unfair. That's because the ViewSonic 7, with resolution up to 1,280 x 1,024, features microprocessor-based memory along with 26 programmable preset modes. And it has a flat square, anti-static screen to eliminate distortion and provide a sharp, crisp to-the-edge picture. Plus, for a flicker-free image, it even

boasts of ultra-high 76Hz refresh rate. For a safer environment, this monitor meets strict low-radiation Swedish MPR-II standards!

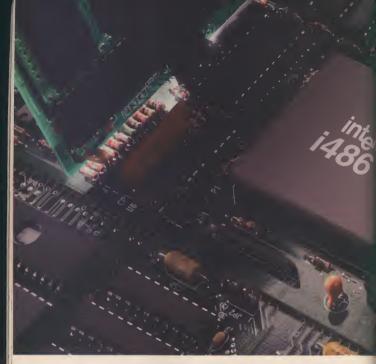
ViewSonic 7 and the 15-inch ViewSonic 6FS — the ideal monitors for full-scale Windows environments.

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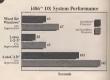
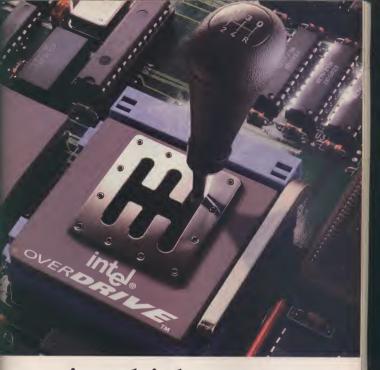


FIGURE 1. Support of the Corporation. "All products are trademarks of their respective companies.
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applications in between. It's easy to install an

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paragraph can be drop caps.) Pick a typeface size, and specify how many of the paragraph's initial characters should be formatted as drop caps. Click on OK to apply the formatting.







Maximize Worksheets

There is no obvious way to adjust the default startup size of 1-2-3 for Windows' untitled first worksheet, short of clicking on the maximize button (the up arrow or double arrow in the top right of the worksheet's window). However, two macro commands, (WINDOW-ADJUST) and (WINDOW-STATE), can do the trick, Either of these commands, run with the correct parameters in an autoexecuting macro, maximizes the window. To adjust the left and top indents to zero and paint a window 640 by 360 juxles, use the adjustment parameters (WINDOW-ADJUST 0.06,093.80); to maximize the state of a window, use (WINDOW-STATE "maximize").

Simplify File Updates

Linking files under 1-2-3 for Windows is a snap, but updating several links isn't always so painless. Part of the problem lies in the order in which you open files. Always open the source files before opening the file with links. This can also reduce recalculation time when the destination file updates itself based on new input.

Make Your Own SmartFill Lists

The SmartFill command is no secret—you enter a number, select a range beneath it, elick on the SmartFill icon, and 1-2-3 for Windows completes the series. With the SmartFak add-in, you can specify custom lists for 1-2-3 for Windows' Smart-Fill command—and have 1-2-3 fill in your budget categories or revenue sources.

To set up custom lists, use Notepad to open

SMARTFLL.IN from the 123W directory, You'll find a list of examples, including the planets listed in order of proximity to the sun. Beneath these examples, include your own sets under separate paragraph headings, starting with [SET 3]. Begin each line with ITEM, a number, and an equal sign with no spaces, then enter the list item. Here's a sample listine.

[SET 3]

ITEM1=Table of Contents

ITEM2=Letters ITEM3=New

ITEM4=Columnists ITEM5=Features

ITEM6=Help

After entering the last item in the list, save the changes to SMARTFLL.INI, and restart 1-2-3 to see the effects.

WGETNUMBER Gets You More

Instead of the plain old macro command GET-NUMBER, use the SmartPak replacement WGET-NUMBER, which not only provides better-looking prompts but also adds three important features: It enables you to specify default input values, acrest formulas as expressions without forcing conversion to values, and allows a macro to terminate during a prompt for input.

The vo and vn macros illustrate the differences between the two commands—the first uses GET-NUMBER, the second, WGETNUMBER, WGET-NUMBER takes up to four arguments. The first is the text inside a dialog box, the second is the range in which the command stores the input to the prompt. The third argument, which is ootional.

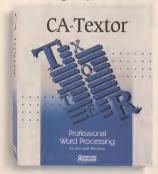


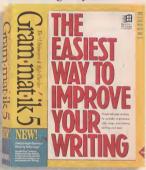
The SmartPak replacement macro command improves on the original with expanded options.

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specifies a default value to enter into the worksheet if you press Enter or click on OK without typing an entry. (The 'n macro does not specify this argument.) The final argument is the title for the dialog box that displays the prompt for input.

Smartlcons Launch Macros Effortlessly Keep your macros a mouse-click away by attaching

them to Smartloons First, make sure your macro works properly, then choose Tools, Smartlcons, Customize. Select an icon from the Custom icons group in the dialog box, and click on the Assign Macro button. Select the Range: text box, highlight a range of worksheet cells containing the macro, and choose the Get Macro button. Then click on OK, and click on OK again in the next dialog box. If your icon doesn't appear onscreen, there are at least three ways to make it visible—you can remove other icons that you don't use, rearrange icons, or make the icon palette float and resize float and

▲ Increase Your Roster of Smarticons

With patience and a steady hand, you can make your own SmartLoons. Unlike many Windows icons, SmartLoons are plain BMP files that Paintbrush can handle. Simply open an existing BMP file from 1-2-3 for Windows 'SREETICO directory to edit, or select Paintbrush's File New, and under Options, Image Attributes, select Pels as the unit of measure, and width and height figures of 768 and 480, respectively. Zoom in on the tiny image, and edit the map grid until you have what you want. Then save it in SHEETICO, and you'll find it in the Tools. SmartLoons, Customize dialog between

Simplify Macro Debugging

Testing short blocks of code before integrating them into a full macro makes debugging much quicker and easier. Press Alt-F3 to bring up the Tools Macro Run dialog box, and pick the block of code you want to run. There are several ways to do this: Enter the cell address or use arrow keys to move to it; enter the range name for the first line of code; or pick the range name from the dialog box's list. To test discrete sections of code in the middle of a larger macro, copy them to a different range before trying this technique.

MICROSOFT EXCEL



Look, No Sheet1

The startup blank worksheet is a nuisance to those who usually work on ready-made documents. To

KILLER TIP

OPEN MULTIPLE FILES AT A STROKE

Starting in Release 4.0, Excel extended the use of the mouse for selecting groups to the File Open dialog box. To open several files at once, either click on the File Open icon or select the File Open menu. In the dialog box, you have several options for selecting the files to open. Either drag the mouse through a group of continuous filenames or click on the first filename in the group, hold down Shift, and click on the last. To select a discontinuous group, hold down Ctrl while selecting several filenames. Once you've selected the ones you want, press Enter or click on OK, and Excel opens them.

stop Sheetl before you start, click on Excel's icon in the Program Manager, then press Alt-Enter. In the Properties dialog box that pops up, add the parameter /E after the reference to EXCELEXE. Now Excel will load with a blank work surface.

Mouse Click for Best Fit Columns

Excel's Best Fit option is no secret—to ensure that each column is just wide enough to include all the characters it contains, select the column, choose Format, Column Width, and click on the Best Fit button in the ensuing dialog box. But this is the long way around. For a quick fit, click on the column letters to select the columns in question for click at the intersection of column letters and row numbers to select the entire worksheet), then move the cursor along the column headings until it changes to a black line with a double-headed arrow through it. Double-click the left mouse button, and the columns are altered automatically for the best fit.

Generate Extended Characters Quickly

Most Windows applications offer two ways to generate foreign currency symbols such as £ and Y and other extended characters: You either copy them from the Windows Character Map or press the Alt key and enter a four-digit code from the numeric keypad. For example, to generate copyright (©), registered trademark (°), and plusor-minus (£) symbols, press Alt-0169, Alt-0174, and Alt-0177, respectively. Excel 4.0 provides a third option—Alt codes with only three digits.

Though the characters available through the three-digit sequences are a subset of the four-digit options, they cover many of the more commonly used symbols:

If you're looking for a computer that will grow with your needs, there are basically only two ways you can go.

The hard way.



Add networking card, reconfigure your system. To share files and sena

e-mail to other PCs you may have to add a card. This means going through the long, ted

process of reconfiguring your system. On a Mac, you just plug in a cable

Upgrade your memory, reconfigure your system, Add memory to a Mac, and it reconfigures itself accordingly But add memory to a PC, and you'll almost always have to run a setub treoram to configure the new memory-or the computer won't know what to do with it.



Add almost anything, reconfigure your system, Extraodica your PC's capabilities can be amazingly frustrating. But a Mocrash easily adjusts to whatever extra device you add to st

> Change monitors, system, Add a new monstor and you'l have to reconfigure your entire systemor your monitor could look like this one. A Mac recognizes a new monitor







Whoops! When you add somethow to an ordinary PC, you may have to "reconfigure your system - a process of hardware and software adjustments, which can be complex tedious, and take up bours of your time



Manual labor. Software like Windows purports to make things easier But the reality is, you'll still spend bours reading manuals just to make it all work - time you could spend doing more useful things with your combuter,

Add Windows, buy a new PC, Most PCs in sust today weren't designed for graphical computing So if you want to run Windows, you may have to buy a new computer. Why



inds, reconfigure your configure a special software driver. system, Multimedia (No need with a Mac - you just romsses to be the future sound, it'll cost you time and trouble - not

to mention money On a Mac, sound is built in

Call for help. write a check. There is one easy way to expand a complicated PC-hire somebody else to do it for you. Over time, of course, that can wind up costing you more than the PC*



ure your system for each one. Want to add a CD-ROM or hard disk drive? Then tree pare to spend hours installing cards, flapping switches and editing files- for each one. With a Mac, you can add up to seven peripherals by simply plugging them in and clicking a button or two.

Add printer, adjust DIP switches. Hooking up a printer seems easy. Until you sel your DIP saystches. install your driver, locate your Windows dishettes. make an error and start all over avain.

blue it in.)



Expand your PC, take two aspirin, Inevitably, you'll want to expand your computer's capabilities by adding extra devices. The more instructions you slog through and switches you fiddle with, the more time it will take And the more pain reliever you'll need.

500 Tablets

On a typical PC, even adding a simple hard disk can be extraordinarily complicated. You'll probably have to "reconfigure" your system—the timeconsuming process of telling your computer what pieces you've added. You may have to edit complex CONFIG.SYS and SYSTEM.INI files, install special device drivers and fiddle with DIP switches. And, of course, building even a basic network is extremely difficult—what with installing

The easy way.



eards and networking software. An Apple' Macintosh', on the other hand, knows when you've added a hard drive. Installing a CD-ROM drive or scamer is a matter of plugging in a cable and clicking a couple of buttons. Even installing a network requires nothing more than plugging one Mac' into another. It's just one more example of how a Macintosh works in a simple, logical way, So you can, too.



If you know how to use a plug, you know how to expand a Macintosh.



in Overall Customer Satisfaction. And no wonder whether you're writing a letter or adding a CD-ROM drive, only Macintosh makes things genuinely easy. Giving you the power you really want from a personal computer. The power to be your best. Apple

For the second consecutive year, J.D. Power and Associates ranked Apple highest among Personal Computer Companies

S

i	Alt-173	_	Alt-170
¢	Alt-155	0	Alt-167
£	Alt-156	39	Alt-175
¥	Alt-157	1/4	Alt-172
a	Alt-166	1/2	Alt-171
	Δlt_174		Alt 169

Comprehensive Search and Replace

Excel's Formula, Replace function makes it easy to update a worksheet by changing all instances of, for example, December to January, Simply key in the text to be changed and the replacement text in the appropriate boxes, then click on OK, If your worksheet is large, highlight the range, row, or column containing the characters in question to restrict the search. If, however, you need to replace question marks or asterisks, you'll encounter a problem. The replace function uses ? and * as wildcards, and will interpret ??? as a command to substitute a replacement for any set of three characters, wreaking havoc on your worksheet. To seek out characters that the search function uses as wildcards, preface each of them with a tilde. To search for three asterisks, for example, enter ~*~*~* in the search box.

Don't Be Fooled by Rounded

Numbers formatted with the General number format aren't always what they seem. This format rounds off numbers to fit the column width without affecting the cell's actual value—so in a cell whose actual value is 3.14857143, you might see 3.148. Large integers are shown exponentially—so I'm fillion would appear as IE-P(T. If you need to see precise numbers at a glance, use another number format: Highlight the range of numbers, select Format, Number, and click on 0, for example. Any number that won't fit the column width shows up as a series of crosshatches (###), which is a glaring sign for you to adjust the column width.

Customize Default Document Templates

To produce new worksheets, charts, and macro sheets formatted the way you like them, save a new template in the XLSTART directory. The format of new worksheets, charts, and macros depends on three templates, SHEET.XLT, CHART. XLT, and MACRO.XLT, which are superseded by files of the same name saved in XLSTART. To test this technique, change the formatting of a blank worksheet and select File, Save As. Select Excel's subdirectory XLSTART as the target, and enter the name SHET.XLT as the name. In the Save

File as Type box, scroll down to Template, then click on OK. The next time you start Excel or open a new worksheet, it will appear with your formatting. To return to the default settings, simply detes SHEET.XIT from XLSTART. You can use the same technique to modify the default Chart and Macro Sheet—but always be sure to save the files as templates. Any worksheet or macro that's saved in XLSTART opens, automatically when you start up Excel.

▲ Disable Drag-and-Drop Warning

Is Excel's drag-and-drop warning—"Overwrite non blank cells in destination?"—getting you down? Disable the warning. Start Notepad, locate EXCEL4.INI in the Windows directory, and open it. In the [Microsoft Excel] section, insert the line

DragWarning=Ø

Next time you start the program, you can overwrite existing data using drag-and-drop with nary a peep from Excel.

QUATTRO PRO



Ledit Columns or Rows in a Snap

To select and edit a column or row quickly, click the right mouse button on the column letter or row number. This selects the whole column or row and brings up the Active Block editing box. However, this trick doesn't work with multiple selections—with them, you must press Ctrl and click on all the selections with the left mouse button, then click on one of the selections (with Ctrl still held down) with the right button for the Object Inspector.

Open Worksheets Direct from DOS

As with any Windows program, you can start Quattro Pro for Windows directly from the DOS prompt—just enter WIN QPW. Assuming both Windows and Quattro are in directories on your path, Windows will start and Quattro will load automatically. You can take this technique one the pfurther to load files and even macros. The following line, for example, loads the program, a worksheet, and the macro M.

WIN OPW C:\SHEETS\DATA\REPVEWR \M

Note: If you use the Startup group to load programs, Quattro Pro for Windows may not be the active window when Windows has finished loading. If it isn't, press Alt-Tab repeatedly until Quattro's name pops up, then release Alt to switch to it.

Add Custom Menu Items

Make Quattro for Windows fit your work patterns by adding your own menu items. The eastest way to do so is by using the macro command ADDMENUITEM. It takes as few as three arguments to place a new menu item and assign it a macro: The first argument specifies the standard menu item before which your menu item appears, the second names the new menu item, and the third assigns a macro to the new menu item. ADDMENUITEM can also insert lines between menu items to form crouns.

But any changes you make with ADDMENU-ITEM are not permanent, so it's best used in an autoload macro. This example uses ADDMENU-ITEM to add two new items—Average and Standard—to the Tools menu, just before the Advanced Math item:

\8 {ADDMENUITEM "/Tools/Advanced Math", "A&verage", "MACRO avgonly"} {ADDMENUITEM Tools/Advanced Math", "St&andard", "MACRO stdonly"} {ADDMENUITEM Tools/Advanced Math", "-------"]

avgonly @AVG({Up 2}.{End}{Up}){Down} stdonly @STDS({Up 2}.{End}{Up}){Down}

The & in the second argument designates the underlined active letter in an item's name. The keyword MACRO in the third argument names the menu item's macro. The final line in 10 separates the new items from the Advanced Math with a line.

Note: The macro Avgonly takes an average of a column of values starting two cells above the current cell, and Stdonly calculates the samplebased standard deviation for a column of values starting two rows up.

Navigate Notebooks with Macro Button Menus

Don't click on tabs and scrollbars to navigate your notebooks—use macro buttons to go exactly where you want. First, select a blank page in your worksheet for the menu, then click on the button icon in the SpeedBar. Move the cursor (which will change to a dotted box containing the letters ABC) to an appropriate spot, and click to place it. Replace or resize it if necessary by dragging, then click on it with the right mouse button. Under Macro, use the SelectBlock command followed by a page letter and cell address. For example, to make the button take you to the first cell on page A, enter (SelectBlock A:A1) in the Enter Macro box, and click on CK. Right-click on the button again, and under Label Text,

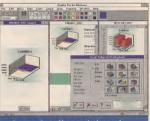


give the button a helpful name, such as Expenses. Click on OK, then left-click on the button to see how the macro works

In the destination page, repeat the process to create a button to return to the menu. If your menu page is D, for instance, assign the macro (SelectBlock D:A1) to the button, and label the button Return to Menu.

Generate Great Graphs

When you're adding graphs to your worksheet, keep a graphical audit trail to ensure that the options you pick make your point best. To check out your graphing options, click twice on the graph in your worksheet. When the graph window pops up, select File, New to open a new window, then select Window, Tile. Next, select the chart in your main worksheet, press Ctrl-Ins, and click on the new



Quattro Pro offers a plethora of graphing options—so keep an audit trail of your choices.



IF YOU WANT THE LATEST IN WINDOWS WORD PROCESSING. WE'LL TAKE YOUR WORD FOR IT. WordPerfect for Windows combines

all the power of the world's most popular word processor and all the ease of Windows. Which is why it won major industry awards and sold more than a million copies in its first seven months. Now with drag and drop text, DDE, zoom edit and more, WordPerfect for Windows is even more powerful. And our \$129 offer makes it easy for owners of MS Word and other word processors to trade up. See your participating software reseller for details, or call (800) 526-2615. But hurry. This offer ends March 31, 1993.













worksheet. Press Shift-Ins to paste in the chart, then click on the graph-editing window. Change legend, text, axes, and chart type at will, view the changes in context in the main worksheet, and compare them with the static graphic in the third window. Periodically paste a new iteration of the graph into the third worksheet, and compare the effects. When you've decided on a final look for your graph, either delete the audit trail worksheet or save it for later reference.

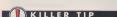
Run 1-2-3 Macros in Quattro Pro

While Quattro Pro for Windows can run many macros from imported 1-2-3 worksheets, it needs to be warned in advance. First, click on Quattro's title bar with the right mouse button to invoke the Object Inspector. Select the Macro entry in the list on the left side of the box, check the Key Reader-check box, and click on OK. You can now run 1-2-3 macros. Since Windows reserves the Alt key for selecting menu items, however, invoke the macro with the Crit key and letter instead.

Note: Some macro commands—such as keystroke commands for the Wysiwyg menu and 1-2-3 for Windows—cannot be interpreted by Quattro's Key Reader.

Create Easy-to-Read Macro Listinas

Quattro Pro's Tools, Macro, Record feature translates keystrokes into macro commands and writes them into a macro file. If, however, you want an easy-to-read listing, change the default option to keystroke recording. Instead of (SelectBlock B:A1), for instance, you'll get a line that corresponds to the keystroke syou'd use to re-create the action—in this case, (Alt-elgbal —. The only dif-



SUM ROWS AND COLUMNS IN

That the TurboSum button (marked in the SpeedBor with a sigmo [2]) on a sum raws and columns is no secret—simply select the cell to the right of or of figures or beneath a column, click on it to insert the RSUM function, select the odjocent figures, and press Enter for the total. But the TurboSum button can olso sum all the rows and calumns in a worksheet in one quick pass. Select the whole toble, plus ane calumn to the right and are raw below the toble, ond click an the button. Quottro inserts the requisite formulas, and a quick press. Sel Enter sums each raw ond column.

ferences are that curly brackets enclose nonalphanumeric keys and key combinations, and the Enter key is represented by a tilde (-). To change to keystroke recording, select Tools, Macro, Options, Keystroke, OK. You may want to change the default address recording to relative, under Tools, Macro, Options.



DATABASE MANAGERS

APPROACH



Nudge Keys for Precise

Control the placement of objects with fine precision in forms, reports, form letters, and mailing labels by using the arrow keys to nudge objects one pixel at a time. While in Design mode, select the object you want to move—this could be a fick, check box, radio button, graphic, or text block. Press an arrow key on your keyboard to move the object by one pixel. Choose Enlarge to zoom in up to 400 percent for even finer control.

Automate Routines

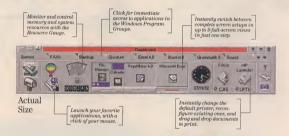
Make your database perform routine operations automatically: Create a macro named OPEN that specifies desired sorts and searches. Approach will run the macro whenever you open the database.

Instant Value Lists for Easy Data Entry

Improve accuracy and speed of data entry by using Approach to generate pick lists that display available choices for specific values. This is particularly beneficial if values, such as cities or customer types, are used for many records. In Design mode, select a field, and double-cilck on it to be one the Field Style dialog box. Open the value list by clicking on the Value List button. Choose the Use Database Field Values radio button to create the list based on the data that already exists for that field (or any field, including one from a different

INTRODUCING ALITTLE SOMETHING FOR WINDOWS SPEED FREAKS

Dashboard



Mention the word "fast," and Windows users get a wild look in their eyes. Why? Because they have a need. A need for speed. Well, here's a little something that satisfies those cravings: Introducing Dashboard: "The fastest way to work in Windows.

Dashboard is the convenient push-button utility panel that makes quick work of complicated operations in Microsoft Windows? Zip into your favorite applications with a click. Switch between different full-screen views of applications in one step. Instantly change the printer default, or drag and drop documents to print...never has so much speed and convenience been packed into so little screen and disk space. Everything, even a clock with alarms, and a "fuel" gauge to monitor your memory usage. is instantly accessible.

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Dashboard
The Fastest Way To Work In Windows

database). Select a field you want to apply the list to, click on OK to get back to the main screen, and return to Browse mode—when you click on the field. a dron-down list of choices appears.

Calculate Anniversaries with Ease

Use a macro to calculate an employee's years of service based on hire date. Place this formula in a calculated field called YEARS:

IF(Isblank(HIREDATE), 'Hire Date Field is Empty. ',
 Trunc (((Today()-HIREDATE)/365.25),0))

The formula assumes that the database includes a field named HIREDATE and another field for the result, the number of years employed. If the HIREDATE field is empty, the formula prompts you. If this field contains a date, the program subtracts the employee's hire date from the current date, divides by 365.25 to convert that number to a number of years, and rounds it to a whole number. The result is the total number of years since hire.

Check Data-Entry Accuracy

Skipping a digit when you're typing in a number can be disastrous—and it's almost inevitable when you're keying in hundreds of numbers. Say that you want to confirm that a social security number field is either nine digits or left blank. Go to Field Definition from Design mode, and select the social security number field (SSNUM). Click on the Options button at the lower right corner of the screen. Under the Check Entered Data section, check Formula is True, and enter the following formula:

Length(SSNUM)=9 or (length(SSNUM))=Ø

Approach will now allow entries of only 0 (blank) or 9 characters in length in the social security number field.

Year-to-Date Totals at a Click

Use an Approach macro to accumulate year-to-date totals after you update your data. For example, suppose you have a membership database



After you update your data, Approach can calculate accumulated tatals, such as year-ta-date sums, at the click of a mause buttan.

with fields for DUES and YTD DUES. Go to Design mode, select Define Macro from the Edit menu, and name the menu YTD. Click on the Set box located in the Actions portion of the dialogs box. Then select the field YTD, DUES, and Livey YTD, DUES and DUES to the formula text-entry box. Click on Add to update the macro and on OK to save the definition. Use the button tool to add an Update button to your form, and assign the newly created macro to it. Each month after you enter the dues paid, click on the Update button, and Approach will add the dues amount to the total in the YTD, DUES field.

Join Tables for Simple Data Entry

Point a field in one table to a field in another to avoid mistakes when you're entering state abbreviations. First, create a database with a field for STATES and a two-character field for ABBREVS.



Approach's pick lists speed up data entry and also reduce the possibility of typographical errors.

Enter all 50 states and their abbreviations, and save the database as States. Next, create a new form in your Orders database, and select Join from the File menu to link the databases on the STATES field. Double-click on the STATES field to display the Field Style menu, choose STATES from the Order Entry table, and make sure the length is 13 characters to accommodate the longest state, Next, select Value List, choose Use Database Field Values, and select Include Descriptions from Field, Choose the States database in the box on the left, and select the field ABBREVS. In the box on the right, select States to match the abbreviations in the States database to their spelled-out names. Close out the dialog boxes, and go to Browse mode. When you click on the STATES field in your Orders database, a drop-down

Using Microsoft Publisher, Dan Matson trained his PC to do some pretty amazing tricks.



Dan Matson, owner and manager of Animal House, a pet store in Norwich, Con-

necticut, uses Microsoft Publisher to do all of his newsletters, brochures, invoices, fax forms, business cards, coupons, etc.

The reason why?

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Label Porch Virgand design assistants.

Take PageWizard* design assistants, for instance. These interactive design templates walk you through the actual creation of a publication. On a step-by-step basis.

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Speaking of tricks, you can get even more templates, fonts and clip art with the new Microsoft Publisher Design Pack.

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list of states will appear-select a state, and its abbreviation appears in your form.



COPY MULTIPLE DATABASE FIELDS TO THE CLIPBOARD

Ever need to extract a few fields of data from a database to paste into another application? To capy multiple fields to the Clipboard-for instance, a name and address far a letter-create a new mema field, and place the new field in your farm. Next, create a macra and click on the Set aptian to execute a farmula that combines the data from the name and address fields with proper formatting into the mema field. Assuming your database cantains six fields-FNAME, LNAME, AD-DRESS, CITY, STATE, and ZIP-type in the following farmula, selecting the codes and field names from the pick list to ensure occuracy.

> Combine (FNAME, ' ' , LNAME, CHR(13), CHR(10, ADDRESS, CHR(13), CHR(10), CITY, ' ', STATE, ' ', ZIP, CHR(13), CHR(10))

When you execute the macra, the text fram these fields are formatted as shawn below.

John Smith

San Francisco, CA 94100

You can now copy the contents of this field into the Clipboard and paste them into your word processor.

FOXPRO



Compile and Execute in One Step Save time when debugging your code, Modify your

code as needed, then press Ctrl-O to compile and execute the program in one step.

Rerun Commands Quickly

Run commands a second time by opening the command window, placing your cursor on the command you want to repeat, and pressing Enter. If the command doesn't work the first time, modify the command and run the altered version. The command window stores all your commands in each FoxPro session, Press Ctrl-F2 to open the window at any time, except when running or compiling programs.

▲ Give Quick Tips to Application Users

Need to convey information to an application user? Use the SET MESSAGE TO command in your program, and the information will appear in the status bar. For example, the following line tells a user how to obtain additional help on a form:

SET MESSAGE TO "Click on ? for More Information"

Right-Mouse Clicks Save Time

Set your right-mouse button to act as the Enter key to save time switching between your keyboard and mouse. Open a program, and add the line below so you can execute commands and select items:

ON KEY LABEL RIGHTMOUSE KEYBOARD CHR(13)

Close All Windows at Once

If you've got a lot of windows open at one time, hold down the Shift key and select File, Close-all the open windows will close. Select File, Close to close only the active window.

Reallocate Resources for Better Performance

FoxPro is set up to use 90 percent of your available memory by default. Cut down its drain on system resources, and your other applications may run better. Use an ASCII text editor to create the file CONFIG.FPW in your FoxPro directory. Enter the following line to allow FoxPro 60 percent of available resources with a minimum allocation of 1MR and a maximum of 3MB:

MEMLIMIT= 60, 1024, 3072

Add the time to your status bar by adding this line into CONFIG.FPW:

CLOCK=STATUS

MICROSOFT ACCESS



Compile Before Saving to Save Time

Get better performance by compiling your code before saving it. If you don't, Access recompiles code on the fly when you execute each procedure and subroutine, which makes execution seem slower.

Make Fields Appear When You **Need Them**

Create intelligent fields that appear just when you need them. Set up an example form called WIDG-FORM that has a check box field called TAXABLE and a numeric field named TAX RATE. Create a

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Program Manager relax You're about to discover what half a million delighted DOS and network

users already know = That the shortest distance hetween you and vottrnrograms is

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Direct Access searches your disk gathers your programs into logical groups and builds menu screens just like the one you see at the top of this page.

All by itself. That's right. You just load it and

Whenever you want an application,



do is hit one key. Or, if you prefer, click one

The more applications you have on your disk, the more you'll delight in Direct Access.

That's because Program Manager insists on grouping your programs into five arbitrary categories: "Windows Applications," "Non-Windows Applications," "Accessories," "Games" and "Main,"

Not very intuitive, eh?

Direct Access, on the other hand, gives you a multitude of utterly sensible program groupings - 17 of them

And that doesn't count the customized ones you dream up yourself

What does all this mean to you? It means you can get to a spreadsheet by simply clicking "Spreadsheet" Sum-

bard disk, groups generales menus

mon a word processor by stroking "W." And access a DBMS by selecting, you guessed it. "Database,"

You can even park your favorite programs right on the main menu and ask for them by name.

Hey we didn't call it Direct Access for

If the only PC you're responsible for is the one on your desk. Direct Access is valuable indeed

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new module, and add these lines:

FUNCTION NOTAX()
DIM F AS FORM
SET F = FORMYSHIDGFORM
IF FITAXBALLE < Ø THEN
FITAX, RATE. VISIBLE = "YES"
FITAX, RATE. VISIBLE = "YES"
FITAX, RATE. VISIBLE = "NO"
FITAX, RATE. VISIBLE = "NO"
FITAX, RATE. VISIBLE = "NO"

ENDFUNCTION



Don't clutter Access screens—make fields (like the tax rate box at left) appear only when you need them.

Save the module as NOTAX, and open WIDFORM in Design mode. Then open the text box properties for TAX_RATE, change both Control Name and Control Source to TAX_RATE, and change the value in Visible to No. Open the Label properties for TAX_RATE, and change the Control Name to TAX_RATE, and change the Control Name to TAX_RATEL and VISIBLE to No. Next, open the check box properties for Taxable, and change the value in After Update to = NOTAX(). Finally, open Form Properties for the entire for WIDGFORM, and change the value in OnCurrent to = NOTAX().

Open WIDGFORM in Form mode, and elick on the check box—the Tax Rate value will appear when the box is checked and disappear when it's not. This function works by checking the value of Taxable—a Yes or No box. If the value is Yes, Access hides the TaX, RATE field, and the After Update property undates the seren immediately.

Drag-and-Drop Macro Writing

Access makes full use of drag-and-drop functionality—use it when creating macros to save time and keystrokes. Open a database window, then select File, New, Macro to create a new macro. Position he Macro window so that the database window is visible. Now drag any queries, tables, macros, forms, and reports to the Action portion of the Macro window; Access fills in the correct macro action and information. For example, if you have a query named TAX_RATE, drag it to the Action portion of the Macro design window. Access places OpenTable in the Action portion and fills in the correct information in the fields below.

Assign Shortcut Keys to Access

To run any procedure automatically when you open a table, create a macro to redefine any keys for your form or table. To create a keystroke shortcut to perform a query, for example, create a macro called AUTOKEYS, go to Design mode, and



Create an Access macro to assign timesaving keystroke shortcuts that perform common functions.

elick on the Macro Name button to show the column. Enter ^Q to set the Ctrl-Q key, and select OpenQuery from the drop-down list box. Enter the name of your query in the QUERY NAME field below, and save the macro. When you type Ctrl-Q in this table, Access performs your query.

Quickly Create Tables

A quick way to create tables is to open a table (such as Access's sample table, NWIND.MDB) in Design mode, select a number of fields, copy them to the Clipboard, then paste them into a new table. Access conies all comments, properties, and field



SAVE STEPS AT COMPACTING

Databases become fragmented much as hard disks do—select file, Compact Database on a periodic basis to optimize your tables. Save steps when compacting databases by giving the destination database he same name as the source. Access creates a temporary copy of the database, then renames and discards the original when the compacting is complete.

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names to the new database. Create a standard table for name, address, city, state, zip, and any other field you need, and use this as a template for future tables.

Run Commands at Startup

Create a macro that launches itself whenever you open your database. To create a macro that minimizes a table when you open it, for example, click on the Actions column of the macro design form, and select Minimize from the drop-down list. Add any other commands you want, and then save the macro as AUTOEXEC—it will run when you open the database. You can bypass the macro by holding down the Shift key while opening the table or form.



PARADOX



Fewer Fonts Make for Faster Displays

Variety in fonts makes forms look great, but it's possible to have too much of a good thing. Keep fonts to a minimum for significantly faster report printing and screen updating. Also, stick to internal printer fonts whenever possible—they faster than fonts available through other font managers.

Customize Your Menu with ObjectPal

Override your Paradox menu and replace it with one of your own making using ObjectPal. To set up your form menu like a Windows menu bar, with File and Edit on the left of the sereen and Help on the right, open the Property Inspector, select Methods MenuAction, and type in the following code:

```
var
ml Menu
endvar
```

ml.addText("&File") ml.addText("&Edit")

ml.addText("\ØØ8&Help")

m1.show()

This routine overwrites the default menu with the newly created one when you're editing data. Customize your menus in any form, but make sure to add the code that determines where each menu item branches.



The personnel touch—Paradox lets you add scanned photos of employees to their records in your database.

Load Graphics into Forms With a Click of a Button

You can add scanned mug shots of your employees to a personnel database with Paradox's graphics field—then update the images in one step with this ObjectPal code.

Create an employee table with fields for first name, last name, and ID; a graphics field named PIXS; and any other fields you need. Next, go to the forms designer and place the fields as you want them to appear, making sure to size the graphics field so that it can be viewed easily. Use the button tool to create a button, and replace the text in the button with Update Graphic, for example. Remaining in Designer mode, click on the button to select it, right-click on it to open the Property Inspector, and select Methods. Choose pushButton method and click on OK to open the object methods, Add the following code.

```
var
bupfile Graphic
endVar
self.edit()
if bupfile.readFrunFile(":GRAPHICS:"*ID.VALUE*".bmp")
then PIXS.VALUE-bupFILE
ELSE
msglnfo("Mhoops!","Can't find a
picture for "*ID.VALUE)
endIf
self.emGddit()
```

Close the box by double-clicking on the Control

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Menu button. Now select Aliases from the File menu, and create an alias called GRAPHICS that points to the directory in which you store your scanned images. Rename each graphic to match an 10 field on a one-to-one basis—for example, if Michael Smith has an 1D of Al005, you will have to copy the scanned image of this employee to Al005.BMP and place it in your GRAPHICS alias directory. Use any Windows graphics format give want, but you'll have to modify the ObjectPal code to change it—this one's set un for BMP files.

Finally, open the form you created, and begin entering data. When you're through with a record, click on the Update Graphic button to paste the image in the graphics field. If there's no matching graphic, Paradox displays an error message.



KILLER TIP

INVOKE FILEBROWSER INSTANTLY

Add a button to your form that runs FileBrowser, Porrodox's powerful file-monagement utility—then have the selected filenome stored as an ObjectPol variable, colled oneFile, that can be colled later. Assuming that you've gat or MEMO field in your from, add the following code to the pushButton method when in Design model:

var oneFile String Notes memo endVar fileBrowser(oneFile) self.Edit()

Since the file selected from FileBrowser is stored as a variable, you can call it up later in your ObjectPol code—for example, poste the file's contents into the MEMO filed with the ReadfromFile method.

Designer SpeedBars

Configure your SpeedBar and place it anywhere on your Paradox sereen. Select Properties Deaktop from the main Paradox menu, click on Floating, and select Rows and Columns to alter its apearance. You can now drag your detached SpeedBar anywhere onscreen to conserve your valuable workspace.

If you're creating a form or report, right-click on the SpeedBar to change its properties and operation. For example, if you have a framed box around your fields, click on the frame to select the box, then choose Properties Copy to SpeedBar.
The next box you create inherits the properties of
the first, including its frame. This technique works
with fonts, lines, and ellipses, but some properties
can't be changed.

Check Available Disk Space While

Tables with graphies can eat up precious disk space fast. Add a button to your data-entry form so that you can instantly check available hard disk space. First, open your form in Design mode, and use the button tool to create a new button. Select the button, and click the right mouse button to bring up the Property Inspector. Select Methods, choose pushButton, and add the following code.

var c FileSystem freeSpace LongInt endVar

if c.findFirst("c:*.*") then
 freeSpace = c.freeDiskSpace("c")
 msgInfo("Available Disk Space", String(freeSpace)
 + " bytes")
endIf

This routine works by using ObjectPal's findFirst to check to see if any files exist. If so, freeDiskSpace reads the amount of available disk space and places the number into a string, which is then displayed in a dialog box. Add /1000 after freeSpace in the next-to-last line to display the information in kilobytes.

SUPERBASE



→ Play Sounds in Superbase

Customize Superbase applications with sounds that play when dialog boxes open on any PC that has a sound driver installed. Select Program, Edit, and enter the following subroutine:

REGISTER CLEAR REGISTER

"C:\WIN31\SYSTEM\MMSYSTEM", "sndPlaySound", "ACH" wav\$ = "c:\win31\tada.wav"

flag% = 1

d\$ = "New Selection" w% = 160:b% = 125

a% = CALL ("sndPlaySound",wav\$,flag%)

The program works by registering the multi-

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advanced statistics are availwon't grow out of this package.

capabilities." – Marc Ferranti, PC Week. Create business charts or statistical charts the histograms have been experienced to the control of the control of

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Menu button Now select Aliases from the File menu, and create an alias called GRAPHICS that points to the directory in which you store your scanned images. Rename each graphic to match an ID field on a one-to-one basis-for example, if Michael Smith has an ID of A1005, you will have to copy the scanned image of this employee to A1005.BMP and place it in your GRAPHICS alias directory. Use any Windows graphics format you want, but you'll have to modify the ObjectPal code to change it-this one's set up for BMP files.

Finally, open the form you created, and begin entering data. When you're through with a record, click on the Update Graphic button to paste the image in the graphics field. If there's no matching graphic, Paradox displays an error message.





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oneFile String Notes memo endVar fileBrowser(oneFile) self.Edit()

Since the file selected fi variable, you can coll code-for example, po MEMO field with the Re

Configure your Sp on your Paradox so top from the main ing, and select Roy pearance. You ca SpeedBar anywhe valuable workspace If you're creatir

→ Designer Spee

on the SpeedBar to eration. For exam around your fields.

hox, then choose Properties Copy to SpeedBar. The next box you create inherits the properties of the first, including its frame. This technique works with fonts, lines, and ellipses, but some properties can't be changed.

Le Check Available Disk Space While **Entering Data**

Tables with graphics can eat up precious disk space fast. Add a button to your data-entry form so that you can instantly check available hard disk space First, open your form in Design mode, and use the button tool to create a new button. Select the button, and click the right mouse button to bring up the Property Inspector. Select Methods, choose pushButton, and add the following code.

c FileSystem freeSpace LongInt endVar

if c.findFirst("c:*.*") then freeSpace = c.freeDiskSpace("c") msgInfo("Available Disk Space", String(freeSpace) + " bytes") endIf

This routine works by using ObjectPal's findFirst to check to see if any files exist. If so, freeDiskSpace reads the amount of available disk space and places the number into a string, which is then displayed in a dialog box. Add /1000 after freeSpace in the next-to-last line to display the information in kilobytes.



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media dynamie link library (DLL), then setting the Superbase command sndPlaySound to work with the DLL. To make this program work with dialog boxes, place the code that creates the dialog box after line six, then place the lines that open and close the dialog box at the end. When the dialog box is opened, the sound TaDA.WAV will play.

Test Accuracy with Random Records

Produce random samples from your database to test data-entry accuracy. First, make sure your database includes a field containing the Superbase serial number generator, SER. For example, a field named SERIAL_NO, has a default formula of SER(). Next, exit from Modify mode, and cilek on the equal sign to open the Display Group Filter. To select every fourth record, enter this line in the Formula box:

SERIAL NO MOD 4 = Ø

Browse through your records—the filter will sort through every fourth field. You can print a report with the same filter.

Generate Serial Numbers Automatically

It's a good idea to assign a unique serial number to each record in your database to simplify searching and indexing data. Use the SER function to make Superbase assign a serial number to each new record automatically.

When you're setting up a new database, include a serial number field. Choose File, Modify, File or press F3. Click on Add to create a new field. Name it SerialNo and click on OK. Ensure that the data type is Text, then click on Format and set the field size to six characters. Click on OK to return to the Modify File dialog.

Select the SerialNo field and click on the Calculation button. In the Formula box, type

STR\$ (SER (Serial No. Datafile), "0000000")

to set up the serial number function. (Change Datafile in this expression to the name of your database file.) Click on OK when you're done defining fields.

Each time you add a new record, Superbase one greater than the last serial number, which will be one greater than the last serial number assigned. Because Superbase keeps track of the last serial number assigned in the database, serial number are never duplicated—even if you delete records.

Mail-Merge with WinWord

Want to use Superbase data in a letter? Use dynamic data exchange (DDE) to create a direct connection between Superbase and Word for Windows. First open a database in Superbase and select Edit, Copy Link. Then switch to Word and position the cursor where you want to insert a fidel from the database. Choose View, Field Codes to ensure that field codes are displayed. Then choose Edit, Paste Special, and click on Paste Link. You'll see a DDE link statement similar to this:

{DDEAUTO SB4W C:\\SB4W\\DATA.SBF SELECT * mergeformat \t}

Replace SELECT in this code with the name of the field whose contents you want to insert. Then choose Edit, Links, select the new link in the list box, and click on Update Now.

Choose Edit, Paste Special, and click on Paste Link for each field you want to insert, replacing the word SELECT in each code with a fieldname. When you're done, choose View, Field Codes to turn off the field codes display. You'll see data from the current SuperBase record displayed in each code location—choose File, Print to print the elter with this data. If you view a different record in SuperBase, the merge document is automatically updated in Word, making it easy to print as many copies of the letter asy on need.



CROSSTALK



Scroll Back to Important Text

It never fails—the capture buffer is always off when something you really want to save scrolls past. But Crosstalk's scrollback buffer offers an easy fix for this perennial problem. Just use the scroll bar on the right of the session window to scroll back up. When you find the text you want, select it and choose Edit, Copy to copy it to the Clipboard.

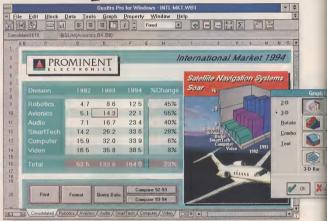
Lange Settings with Ease

For quick access to Crosstalk settings, double-click on the status line (at the bottom of the screen). Double-click on the left of the status line to change session settings. The Telephone icon gives you

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Excel and 1-2-Quattro Pro



Quattro Pro for Windows is the easiest-to-use spreadsheet ever made. Built with Borland's renowned object-oriented technology, Quattro® Pro for Windows is packed with hot new features you won't find in any other spreadsheet.

NEW! Spreadsheet Notebooks with customizable Tabs are nothing less than a revolution in spreadsheet ease of use. Now you can intuitively organize and manage your spreadsheet data.

NEW! Object Inspector" menus

end the hassle of searching through menus. They're simpler than 1-2-3. Just click the right mouse button anywhere on the screen to get a list of what you can change and change it right there. NEW! Database Desktop™ is the easiest way to incorporate dBASE® and Paradox® data into your spreadsheet. Just what you'd expect from Borland, the leader in database technology.

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YES! Compatible with Lotus 1-2-3 files, macros, and publishing styles; Excel XLS files; and eight graphic formats. Quattro Pro for Windows offers the best spreadsheet, database, and graphics file compatibility available.

3 users preter for Windows

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It's a fact: two out of three Excel and 1-2-3 spreadsheet users tested prefer Quattro Pro for Windows to their current spreadsheet. They say it makes you more productive and is easier to learn and use. That's the result of a study conducted by

> Usability Sciences Corporation, a highly regarded independent testing lab used by major software publishers, including Lotus.



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Never before has so much spreadsheet power also meant this much user productivity. Spreadsheet Notebooks and Object Inspector menus are breakthrough concepts that make it easy to tap the awesome functionality of Quattro Pro.

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November 10, 100

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Software Craftsmanship

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access to modem settings, while the Terminal icon allows you to set a new terminal emulation and change fonts and colors for your session. Double-click on the rightmost area of the status line to specify the default download protocol.

Quick QuickPad Construction

Use QuickPads to run scripts or send keystrokes to your sessions with a single mouse click. To lay out a new QuickPad, begin with a single button. Click on the Button icon and draw the button you want. Select it, and hold down Ctrl as you drag one it runs, you'll be able to isolate trouble spots more readily. First, open a script in the script editor, then open the session that the script is written for. Choose Window, Tile to arrange the two windows side by side. Select the session window and choose Script, Trace to turn script tracing on and open a trace window. Then choose Script, Run, select the script whose source code is in the script edition window, and clock on OK. Crosstalk highlightins of code in the script editor and records their line numbers in the trace window as it runs them in the session window.



Crosstalk puts a host of functions at your fingertips with a QuickPad of customized buttons.

of the object handles. Crosstalk copies the button in rows and columns, creating a grid of buttons. Double-click on a button to assign a script or a series of keystrokes to it, to give it a new label, or to assign a function key to it. When you're done defining the OuickPad. saye it, and it's ready to use.

Trace Scripts for Debugging Ease

Debugging scripts is never easy, but if you use Crosstalk's Trace feature to look at script code as



which shows code as it runs.

NILLER TIP

CAPTURE TO THE TEXT EDITOR

Direct your copture buffer to Crosstoll's text editor so you can clean up captured text before you save it or export it to another opplication. Before you begin copruring, choose Settings, Session, and click on the Copture icon. Under Destination, click on the Text Editor button, then click on OK. When you begin copturing a session, Crosstolk opens o text editor window and directs the copture lag to that vimidow. When you'r beac capturing, use the text editor to remove excess characters or lines. Then sowe the file from Crosstolk or copy and poste it into another application.

DYNACOMM



View Graphics Online

If you're tired of waiting for weather maps or other graphical images to download from CompuServe or other information services, use Dyna-Comm's image viewer to view them online. In



DynaComm's image viewer lets you examine online graphical images without the delay of downloading.



Inside Out

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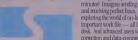


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CompuServe, simply choose READ instead of DoWNLOAD for the file you want to see. Dyna-Comm opens a graphics window and begins displaying the graphic line by line as your modern recives it. When the graphic is complete, DynaComm beeps and returns control to the main session window. Unfortunately, you can't save images you've viewed in this way with versions of the program prior to version 3.10.02.

Adjust the Scrollback Buffer

DynaComm's scrollback buffer is convenient if something scrolls past your screen faster than you can read it and you aren't capturing the text. Just scroll back up the terminal window and find the text you need.

If your scrollback buffer is too short, just choose Settings, Terminal Preferences, and enter a higher number in the box that's labeled # of Buffer Lines. DynaComm's buffer can be as long as 399 lines.

Mouse Clicks Work Online

Use the mouse to pick items and commands from a remote host's text menus. First choose Settlings, Mouse Options to specify how DynaComm interprets mouse clicks. The Left Double-Click group specifies what action DynaComm takes when you double-click on text in the terminal window with the left mouse button. Select Do Nothing if you want DynaComm to ignore left double-clicks. Choose Send Text with CR to make DynaComm copy the word you click on, enter it as if you typed it, and send a carriage return. Choose Send One Character if you want DynaComm to send just the character you click on without adding a carriage return.

The settings under Right Click specify what DynaComm does when you click once in the terminal window with the right mouse button. Position Cursor moves the cursor to the place you click. Choose Send CR to make DynaComm send a carriage return whenever you click the right mouse button.

Encrypt Your Own Passwords

When you write a log-on script, it's a good idea to use an encrypted password. DynaComm's scripting language provides several easy ways to make passwords "for your eyes only." If you're writing a log-on script that will be called from the dialet, use the PASSWORD) function to include the password in the current dialet directory entry.

If you aren't using DynaComm's dialer, you'll need to set up your own password-encryption routine. Use the PASSWORD argument with EDIT- TEXT to cover with asterisks what you type on the EDITTEXT input line. Then use the ENCRYPT function to scramble the password before you save it on disk. For example, the following code creates a dialog box that asks you to type in your password, covers the letters you type with asterisks, and puts that password in \$PASS. It the scrambles \$PASS with the file-encryption password Secret.

SET \$Pass ""

DIALOG

EDITTEXT 85 "Enter your password:"

LIMIT 20 PASSWORD

BUTTON DEFAULT "OK" SET \$Pass EDITTEXT(1), RESUME

WATT RESUME

SET \$PASS ENCRYPT(\$PASS, "Secret")

To use the password in \$PASS, you first need to decrypt it using the password with which you encrypted it. Use the function DECRYPT(\$PASS,-"Secret") to decode the password.

PROCOMM PLUS



Easy-to-Read Screen Fonts

Is your terminal display hard to read? Make Procomm use a different font—one that's easier on the eyes. Press Alt-S to bring up the Current Setup dialog box, and double-click on User Settings. Under Autosize, select Window Based on Font to make Procomm adjust the terminal window size to the font you select. Then click on OK to return to the Current Setup dialog box. Double-click on the Terminal button and click on Font Select.

Procomm displays all the available monospaced (not proportionally spaced) fonts. Pick one of these fonts, and pick a font size. Then return to the Current Settings dialog box and choose File, Save to save the new font.

Meta Key Shortcuts Save Time

Use Procomm for Windows' Meta Keys to send text, run a script, or launch another Windows program. To define a new set of Meta Keys, first choose Window, Setup to see the Current Setup dialog box. Click on the Meta Key button and choose [Create] from the drop-down list. Choose a name for the Meta Key set and click on OK. Double-click on the Meta Key button to define actions for each Meta Key.

In the Meta Key Select dialog box, pick the



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Instant Rolodex card file. Or, you can use Instant Rolodex to write a letter, mail-merge it and print labels for mailing, or turn it into a fax file to send with your fax modem. You see, like Instant Accounting, Instant

There's a Memo Pad to attach notes to any

Rolodex takes the things you do every day, and turns them into information you can use, and provides a course of instant action.

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Meta Key number and keyboard shortcut you want to define. Select a type for the Meta Key choose Text to assign a text string, Script to run a script, or Program to launch another Windows program. Specify the text, script, or program in the Contents dialog box. Double-elick on the Label button to give the Meta Key an identifying label.

To run a Meta Key, press the keyboard shortcut you selected (Alt-function key, Alt-Ctrl-function key, Alt-Shift-function key, or Alt-Ctrl-Shiftfunction key), or click on the Meta Key display in the Precomm window.



VIEW IMAGES AS YOU DOWNLOAD

If you want to view GIF images as you download them, choose Window, Setup, and click an System Settings. Put an X in the box lobeled View *.GIF files during download. When you download a GIF file, Procomm for Windows opens a grophics window and displays the image as it downloads.

If you're using the Zmodem protocol to downlood graphics, click on Skip Filel on the GIF viewer's menu bar to stop downlooding the current file (and begin downlooding the next selected file, if there is one).

Get Rid of Online Message

If you can't get rid of the "Online" message on the status bar after you've hung up, press Alt-J to initialize your modem. Then type AT&CL&DZ&W in the terminal window, and press Enter. The modem should respond with an OK message, and you status line should display the "Offline" message.

Make Operator-Assisted Calls

To make an operator-assisted call, type ATO in the terminal window (don't press Enter yet), then dial out using the phone. After talking to the operator, you hear the connection tone from the remote modem. Press Enter to send the ATO command to your modem. The modem will pick up the line and make the connection. Note: If ATO doesn't work with your modem, use ATXIDT instead.

WINFAX PRO



Clean Up Faxes

Documents sent from a fax machine are frequently marred by spots due to dust or scratches on the fax machine's lens. Convert them to PCX format and clean them up with an image editor before you send them on to someone else. From the Winfax Administrator, select a fax and choose Fax, View to bring up the Winfax Image Viewer. Choose File, Export, specify PCX format, and type a five-letter lie prefix. Then elick on Ok to convert the document. Winfax creates a PCX file for each page of your fax.

Open one of the converted pages in Windows Paintbrush or another application that lets you edit PCX files. Use the drawing tools to erase any ex-



Winfax Pro allows you to convert documents to PCX format for easy cleanup with an image editor.

traneous marks from the document. When you're done, convert the page back to Winfax format by printing it to Winfax. In Paintbrush, choose File, Print Setup, select WINFAX as your printer, and click on OK. Then choose File, Page Setup, and set all of the margins to 0. Finally, choose File, Print. Make sure that Use Printer Resolution is selected, and click on OK. When the Winfax dialog box appears, check Save to File. Type a five-letter file prefix, and then click on OK to save the page.

When you've finished cleaning up all the pages, resend them from the Winfax Administrator. Choose Send, Fax, and select Attach. Add the pages you cleaned up with Paintbrush, and click on OK. The pages are ready to be sent.

- Can't Dial Direct? No Problem

You can use Winfax even if you need to speak with an operator in order to place a call. In order to dial a fax number manually, your fax/modem must be connected to the same line as your voice phone. Before you begin printing to Winfax, choose Print Setup in the application from which you'll be printing, and select Winfax a your printer. Then

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click on Setup (or choose Fax, Setup from the Winfax Administrator). Click on More, and ensure that the Detect Dial Tone box is unchecked. When you send the document to Winfax, type a comma instead of a phone number. Pick up the phone and dial the number you want. When it rings, ellek on OK. Winfax will pick up the line, wait for a connection, then begin transmitting your document.

Send Faxes with a Credit Card

Need to dial a long-distance fax number with your telephone calling card? Let Winfax enter the credit-card number for you. After you type the fax number, type several commas, then your credit-card number. The sequence should look like this:

Number: 0-416-441-0333,,,,,12345678901234

Each comma tells Winfax to wait two seconds, so the above entry would make Winfax wait ten seconds before dialing the credit-card number. Adjust the number of commas to account for the amount of time it takes the local telephone system to prompt you for a credit-card number.

DESKTOP PUBLISHING & GRAPHICS

FRAMEMAKER



FrameMaker Does Drop Caps

Even technical documents can benefit from drop caps, and, although it isn't common knowledge, you can produce them with FrameMaker. To extend the base of a paragraph's initial letter two lines, select it and press Shift-Del to cut it to the Clipboard. Then place the insertion point at the beginning of paragraph and select Special, Anchored Frame. Select the At Insertion option in the dialog box, and set its Baseline Offset to the negative sum of your text's font size and leading. For 12-point type with 4-point leading, for example, set the offset to -16 points. Set the Height to twice the point size and leading, then click on the Edit Frame button.

Select the text frame tool and create a text

frame within the anchored frame you've create, then click in the text frame. Press Shift-clast to paste in the letter you cut, and increase its point size to at least twice that of your body text and leading. With the mouse, manually adjust the width of the anchored frame and text frame to accommodate the drop can.

To indent the second line of text, click at the beginning of it and insert a second anchored frame to serve as a placeholder. Adjust its height and width as necessary, then adjust the drop cap's point size for the best effect. Create a suitable drop cap paragraph style for future use, and make note of the Baseline Offset, Width, and Height of the adjusted anchored frame so that you can repeat the effect.

PAGEMAKER



▲ Inline Saves Time

Trying to space a series of repeating graphics evenly across a page or column is easy when you set up the series as inline graphics. First select the text tool (not the pointer), then click on the page to get a blinking text-insertion point. Place the first craphic using the As Inline Graphic ortion. Select



the graphic, copy it to the Clipboard, then paste it repeatedly until you've got the full quota. For the finale, select the entire line of inline graphics and under Type, Alignment, select Force Justify. The graphics will space themselves evenly between your margins.

placement of repeating images.

"Sure, I remember my first modem...



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Improve Photocopied Gravs

Grayscale halftones that look great coming out of your laser printer are often too dark or too high in contrast when you photocopy the document for distribution. Remedy this by lightening the image in PareMaker's Image Control menu.

Change the Lightness setting from 0 to about 25 percent, or highlight the image and assign it a gray color instead of black. Pantone 424 should work fine. You can also create a CMYK gray between 65 and 70 percent. Select Element, Define Colors, and click on New in the dialog hox to define a color. Click on the CMYK option, and set Cyan, Magenta, and Yellow to 0, and Black to the desired nerentage.

Add Nonprinting Notes

If you need to leave notes about a publication for a co-worker, make editorial comments, or remind yourself of a task left undone, put nonprinting comments in the document.

Set up a distinctive style called Comments that can easily be read onscreen—perhaps using a bright color—and write notes of any length on PageMaker's pasteboard. They won't interfere with the design of the document, and even if you don't get around to deleting them, they'll never appear in print.

Put Your Graphic on Hold

You're about to place a graphic in PageMaker when you realize that you need to make a last-minute adjustment to the document before droping the image in. Don't click on the pointer tool to cancel the placement—instead, simply hit the Backspace key. The graphic will automatically drop onto the PageMaker pasteboard, just to the left of your page, where it remains until you position it.



REVERT TO THE LAST MINI-SAVE

PogeMaker's File Revert command is a handy way to bocktrack out of a messy miskower, but it restores the most recently saved version of the file, which often means that you lose some changes you made on the previous page. Fortunately, every time you move to another page, PogeMaker performs a mini-save, and there's a secret very to revert to the lost mini-save. Just press Shift when you click on Revert, and Page-Maker ask, "Revert to the last mini-save,"

QUARKXPRESS



→ Quick Character Styling

In QuarkXPress, you can apply style sheets to paragraphs but not to short selections of characters. When you need to apply complex text formatting to pockets of text throughout a long document, use the Find/Change option. In your word processor or in QuarkXPress itself, select the text in question and give it an easily applied Text Style that you're not otherwise using (such as Strike Thru, Outline, or Shadow), Then, in QuarkXPress, select Edit, Find/Change, and deselect the Ignore Attributes check box. In the Find what; side of the Find/Change dialog box, deselect Font and Size, and select only the stand-in type style you used. On the Change to; side, select new formatting to substitute for the style you originally applied. Then click on the Change All button.

- Share Style Sheets

If you use Word for Windows to prepare text for layout in QuarkXPress, there's a quick way to use QuarkXPress, style sheets to pretag text in Word. In QuarkXPress, create a blank document that contains the necessary style sheets, then use the Save Text command under the File menu to export the blank document's text in Rich Text Format (there isn't any text, but no matter). When you open the RTF file in Word, the QuarkXPress style sheets will be available. Note: If you save the QuarkXPress text in Word for Windows format instead of RTF, only the style sheets actually applied to text in QuarkXPress will transfer.

Easy Reference with Auxiliary

Don't re-create your word processor's custom dictionary in QuarkXPress—import it. Open a blank document in QuarkXPress, select Edit, Get Text, and import your custom dictionary under the file type ASCII Text. It will appear in QuarkXPress as a list of words, one per line. Remove any words that contain numbers, hyphens, and non-ASCII characters, such as smart quotations marks—QuarkXPress is a bit finicky. Finally, use File, Save Text to save the list as ASCII text with the file extension, QDT.

■ Wrap Text on Both Sides Of a Graphic

QuarkXPress will wrap text on only one side of a graphic in a picture box, not around both. To have your text wrap around both sides of a slender

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Make text flow around a thin graphic by graphic by manually connecting text frames, then adjust the text boxes to get precisely the text wrap that you want.

graphic, create two stacks of one-line-high text boxes on either side of the graphic, and force the text to flow from box to box around the graphic. This process, though labor intensive, can produce excellent results. Select View, Show Baseline Grid, and use the snap-to guidelines to position the text boxes as you draw them. When you reach the bottom, click on the tool palette's link tool and connect the text boxes from left to right across the picture, then diagonally down, and left to right again. Import your text into the upper left text box, and the text flows properly from box to box. You can easily adjust each box to achieve the overall text wrap you want.

VENTURA



Easy Style Tagging

Inserting style tags in long Ventura documents is drudgery. To speed up the process, use your word processor's marco and glossary functions to do the job before you import a file into Ventura. In your word processor's means on early a file and the first table. Create glossary macros in your word processor to insert the tag names at the left margin of the text line. Copy capitalization and spacing exactly, and don't forget the @ symbol. To guard against misspellings, add Ventura's formatting codes into your spell-checker's custom dictionary, and check the document's spelling after inserting tag names.

■ Use Tabs for Easier Tables

While creating a word processing document for layout in Ventura, create tables using tabbed columns, since they can be easily converted in Ventura's Table Editor. Copy each table as a block from your word processor, move it to a separate document, and save each as DOS text with a .PRN extension. In Ventura, load a table file by using the PRN to Table selection in the Load TextPicture dialog box under the File menu. This loads the file as a Ventura table, which you can cut and paste into position.

Fast Return to the Previous

To redisplay the most recently used dialog box, don't reselect menus and menu options—press Ctrl-X. This shortcut is particularly helpful when you're cropping and sizing an imported graphic.

- Painless Multicolumn Headlines

Placing a headline over several columns in a multicolumn Ventura document can be tricky. Select Tagging mode, then click on the headline that you want to cross multiple columns. Select Paragraph, Alignment, and specify the Frame-Wide setting for the Overall Width. This setting overrides the multicolumn format of your underlying page, thus making the placement of individual headlines easy.

CORELDRAW



▲ Interrupt Sluggish Redraws

CorelDraw may make you wait a long time while it redraws complex drawings. Rather than waliging for the program, make it wait for you. Select Special, Preferences, and click on the Interruptible Display box. During any subsequent screen update, just click on any menu item to stop the redraw while you choose your next command.

Lange Tools Quickly

When you're using any tool from the CorelDraw icon bar and want the pick tool (or pointer), press the space bar to change tools quickly. Once you're done with the pick tool, press the space bar again to return to the last tool you were using.

Remove Unnecessary Fonts

CorelDraw 3.0's TrueType collection of more than 200 typefaces takes up a lot of disk space—at between 30K and 50K per typefaces, you're looking at a total of around 7MB. Even if you can spare the disk space, take the time to determine which type-faces you really want. The expanded fort list in WIN.INI slows down the loading of Windows and any Windows application that makes use of type-face metrics and hyphenation tables (PageMaker

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Write Comments on Nonprinting Layers

Need to write production notes about a particular drawing to yourself or a co-worker? Use a nonprinting layer to display your message but keep



layer for remarks and notes that you don't want to print.

your printouts clean. First, press Ctrl-1 to bring up the Layers roll-up, then select the right arrow beneath the Roll-up button. In the pick list that pops up, choose New, and assign the name Comments to the new layer. Click on the box labeled Printable so that the check mark disappears, and click on OK. Whenever you need to make a comment about your drawing, select the Comments layer, click on the text tool, and type away.

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Bar Charts Made Easy and Accurate Other programs may do it automatically, but it's easy to dash off a quick and accurate bar chart in Designer. The key is to keep an eye on the dimensions status line at the bottom of the screen while you're scaling the bars. First, draw a columnar



Bar charts are easy in Designeras long as you pay attention to the dimensions status line.

rectangle with the approximate height-to-width proportions, then press Shift and click and drag on the bar to duplicate it as many times as you need. With Designer's snap-to-grid feature, it's easy to keep the bases of the bars aligned. Then assign a pattern color and other properties to each bar. Scale the bars, using the dimensions status line as your guide-for an 81 percent increase, use .81 inch or 8.1 picas (or another alternative based on your unit of measure). When all your bars are scaled, press Shift and click on each to group them, and scale the whole chart to fill the allotted space before adding legends and titles.

DUPLICATE COMPLEX GRAPHICS-JUST IN CASE

No matter how many levels of undo a drowing program provides, sometimes the only solution is to scrap a design that's gone wrong and stort over agoin. When you're hommering out a complex drawing, drag out a duplicate of the element you're working on and keep it of the side of the page. If things go too far astroy, you'll hove a pristine copy to restore. To make o quick duplicate, press Shift and drog the object away with your mouse.

Recycle Your Symbols

When you've worked hard to create a design element with just the right fills and patterns, keep it on hand for reuse. Instead of saving each drawing



in its own file and resorting to cryptic filenames, create a new file and paste in your favorite design elements along one edge of the page. When they're all in place, you have the perfect template document to start up every time you work on a complex drawing.

Speed-Edit Selected Features

The Edit menu's Select option enables you to transform large areas of a drawing in one stroke y selecting all elements with certain properties in common. For instance, to choose all the objects in a drawing with a red radial fill, first click on one object that meets that description to select it. Then, under Edit Select, click on the pertinent elments (in this case, Pattern Color and Fill Style), and click on the Select button. Designer takes care of the rest.

PHOTOFINISH



Open Files Faster at Startup

Photo Finish's startup screen takes time to load wasted time if you only want to load a new file. Lucklly, you can cut straight to the Load a Picture from Disk dialog box whenever you start the program. Select Options, Preferences, and under At Startup, pick Open. The other options enable you to scan directly on startup, start a new file, or be greeted with a blank screen. This technique also works with PhotoFinish's cousin, Publisher's Paintbrush.

→ Get the Whole Picture

Don't try to work on a large graphic in a tiny box with seroll bars. Machinize the program by elicking on the up arrow or double arrow in the upper right corner of the window, then press CtIFF to zoom to a full-seren view. This removes the menu bar from the top of the page, but you can still access it by pressing Att and either the menu option's active letter (such as F for File) or the down and right arrows.

Remove Screen Clutter for Unobstructed Views

The Palette, Width, and Tools boxes are invaluable when you're working on a graphic, but they get in the way when you're trying to look at it. Press Ctrl-A to hide them all and get an unobstructed view of the picture, then repeat the keystroke to bring them back again. This technique also works in Publisher's Painthrush.



PRESENTATION GRAPHICS

FREELANCE GRAPHICS



→ Steps to Screen-Show Success

If you're going to show your presentation on a PC monitor, make sure you've stepped through everything beforehand. There are three ways to run a screen show-press Alt-F10; select View, Screen Show; or click on the SmartIcon that looks like a movie camera. When you first set up the show, select manual or automatic timing for changing the slides (manual timing requires a mouse click or keystroke to move to the next slide). Under Effects, pick a transition effect, check off Apply to All Pages, and click on OK. Avoid the temptation to use more than one transition-vou could wow your audience, but more likely you'll distract viewers from the points you're trying to make. Most important, click on Show for a preview. If the slides don't fill the screen, select File, Printer Setup, and click on the radio button marked Optimize for Screen Show.

Create Hot Links to 1-2-3 Graphs

With all the graphing options available in Freelance, it's easy to lose track of the quickest of all—copying a named graph from 1-2-8 for DOS. When simple, effective, and quick charts are all you need, reach for Flle, Import Graph. Next, select the WK? file that contains the graph, and click on Named Graphs. Select the graph to be imported from the list box and click on OK. By default, the imported graph will be dynamically linked to the original so that once the file's data is updated and saved, the chart's data also changes. If you prefer a static bart, select Edit, Link Options, and click on the Delete and Done buttons.

Print Patterns Properly On a LaserJet

Some patterns—particularly crosshatches—look fine onscreen, but when printed out on a laser printer they might as well be a wall of gray. The best fix for this is to decrease the graphics resolution of the printout. In Program Manager, select



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the Control Panel, Printers, and click on the LaserJet's Configure and Setup buttons. In the Graphics Resolution window, select 150 dots per inch and click on OK until you're back to the Control Panel screen. This process may reduce the sharpness of other graphics and of certain ATM forts, but it also increases writing steed.

Quick Drop Shadows for Rectangular Objects

Want to make a text box or imported graphic stand out? Here's a quick way to create a rectangular drop shadow. Click on the rectangle tool and



draw a rectangie. While it's still the active element, select Edit, Replicate. The replicated shape is offset correctly for a drop shadow, but it's on top, so select Arrange, Priority, Fall Back One. Now change the shadow's color: Select Style, Actributes, and under Area 1st Color, select a darker shade of the first box's color, or perhaps black. Click on OK. While the shadow is still the active element, press Shift and click on the original rectangle to select it. Use Arrange, Group to link the

two graphics. With a few modifications, this technique works fine for shadowing imported graphics

like the keyboard in the illustration above.

Basic Builds for Effective

One technique for emphasizing a topic in a slide or screen presentation is to display a list of your points repeatedly, highlighting each successive point as you talk about it. This is a quick and easy technique—just write the full list of points in the first slide (in either Outline or Show Slides view), copy it, and paste it into as many slides as you have points. Then apply a text attribute such as boldface or a larger point size to the first point in the first slide, the second in the next, and so on.

For shorter lists of topics that you'll dispatch quickly, try using a build, in which you add points to a list as you mention then. In this case, it's fast-est to start with the full list, copy and paste it as appropriate, then delete words. The judicious use of transitions makes this technique most effective in a screen show. Use the Bottom, Leftside, or Rightside transition for a mock-animation effect in which the new list item slides into place.

KILLER TIP

START FREELANCE FASTER

Once you're used to Freelonce, he welcome screen is superfluous and slows down the loading of presentions you're working an. There are two ways to load the program more quickly—one storts with a blank presentation and one doesn't; both skip the welcome screen. To stort with a blank presentation, open FLWINI in Notepad and either locate a line that storts Skip Welcomes or creet one. This line can have two values, 0 and 1. To load without the welcome screen, insert a 1 directly ofter the equal sign. Sove your changes to the file, and the next time you stort Freedonce, it opens with an untitled presentation (as if world changes no NOMASTERMAS).

The second method loads Freelonce twice as fast and opens to no presentation. From Program Monoger, press All and double-dick on the Freelonce icon. At the end of the commond line in the File Properties diolog box that oppears, enter /Q so that the line reads C.\PLWFEW.EXE./Q. Click on OK, and the next time you start Freelonce, you'll open new or existing presentations from the File menu.

HARVARD GRAPHICS



▲ Harvard's Dummy Data Aids Design

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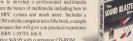
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Eliminate Pie Chart Label Crush

If a pie chart's slice label comes too close to the slide's title or subtitle, rotate the pie to move the label away. Select Pie, Series, Options, and in the dialog box, change the starting angle of the pie to rotate it and move the label clear of obstructions.

■ Use Smaller Labels for Bigger Pies

Show the slice labels on the first pie of a two-pie chart at your own risk—labels steal space from the charts themselves, and both pies will be smaller as a result. If you need to show the labels,



Put emphasis where you want it: Scale type down to allow for larger images in Harvard pie charts.

shrink the text size and enlarge the whole chart. In the Slide Editor, click anywhere within the two-pie area. When selection handles appear, select the Text menu and adjust the font size to balance size and legibility. With the chart still selected, hold down Shift and grab one of the corner selection handles with the mouse pointer and move it until the pie is the size you want. Another tip for increasing the size of your pie chart is to move the legend underneath the pie, or to eliminate the legend allocether.

Copy Data from Formulas

Don't type a formula more than once in Data Form, just copy it. Move to the cell containing the formula you want to copy, press Ctrl-Ins, move to the destination cell, and press Shift-Ins. The formula is copied, and the cell references in it change so that they relate to the new cell. So if you've copied the formula = SUM(B1:B4) from cell B5 to C5, the formula in cell C5 will read = SUM(C1:C4).

Fine-Tune Text Format In Table Charts

To change text position within the cells in a table chart, click on the chart to define it, then choose Text, Set Anchor Point. The anchor point menu enables you to justify the text in either direction or center it and place the text closer to the top, middle or bottom of each cell

Quick Chart Changes

If you want to change the options on any chart while you're in the Slide Editor, bypass the mouse and menu by pressing F8 for the Chart Options dialog box.

PERSUASION

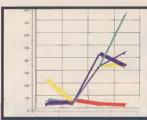


Move Text with Attributes Intact

If you're moving text from one presentation to another, be sure to select the text in Slide view and paste it into the other presentation's Slide view. If in either step you use Outline view, text attributes such as holdface and italic will be lost.

Add Impact to Line Charts

A series in a line chart may look fine in a printed report, but a thin line lacks impact in an overhead transparency or slide. Make the line look more like a ribbon by selecting the Depth feature in the Chart Info box. Click in the Chart Info box, and click on the Depth check box to select it.



For easier viewing and stronger emphasis, add dimension to lines with Persuasion's Depth feature.

Magnify Your Slides

Get a better perspective on your slides with magnification shortcuts. To zoom the view on your slide to 75, 100, 200, and 400 percent of actual size, bypass the Show menu and press Ctrl-7, Ctrl-1, Ctrl-2, and Ctrl-4. Press Ctrl-7 to zoom in one level or



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Shift-Ctrl-Z to zoom out. To return the slide to window size, press Ctrl-W, or click on the right mouse button to switch between 100 percent and Fit-in-Window views.

Find the Key to Extended Keyboard Characters

Want to add symbols or characters from the ANSI set but can't remember the codes? Open XCHAR-SET.PR2 from the PRES directory and check out the list of ANSI characters you can use in your presentations. To generate them in your presentation, turn on Num Lock, hold down Alt, and en-

2					
File	Edit View Iex	d Draw Show			Help
1	1	169	©	214	Ö
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-	f	176	0	221	Ý
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When you con't remember the ANSI code for a copyright symbol, check out Persuasion's handy list.

ter the number assigned to the character. Aldus made an error in its annotation, though—if you see a three-digit number, you must precede it with a zero to generate the appropriate character under Windows.

Pause a Runaway Slide Show

Need to stop an automatic slide show to backtrack or take a little more time to explain a point? There are several key and mouse commands that can control a runaway slide show. The space bar acts as a pause button for an automatic show—press it once and the show pauses, press it again and the show resumes. The left mouse button also pauses a slide show, but since the slide show resumes as soon as you release the button, it works best for short pauses. If you need to return to the previous slide, just press Backspace. If you want to continue, press the space bar or click the left mouse button. Another useful standby is the plus key, which switches between automatic and manual slide shows.

Add Polish with Typographical

Don't spoil the visual effect of your presentation by using hyphens for dashes and typewriter quotes instead of smart quotes. You can insert a range of typographical characters with short memonic codes. To insert smart quotation marks, press Ctrl-{ for open quotes and Ctrl-} for close quotes. For apostrophes, use Ctrl-}, and for em dashes, press Ctrl-Shift-e. Insert proper copyright and trademark symbols using Ctrl-Shift-C (for ©) and Ctrl-Shift-B (for ™).

POWERPOINT



Select Discontinuous Slides

You can reorder slides in PowerPoint 3.0 using either the Outline window or the Slide Sorter view. However, you can select discontinuous slides only in Slide Sorter—hold down Shift and elick on slides at random. Selected slides are framed by a thick box. Click on a slide a second time to deselect it.

→ Improve the Look of Text Shadows

PowerPoint's automatic shadowed effects generally work well, but with certain color combinations in certain fonts, they don't look so good. Fortunately, you can control a shadow's offset and direction. First, enter the text as part of a drawn object (draw a square with the square tool, and enter text while the square is selected). Then select Object, Fill, None. Still in the Object menu, choose Line, None. Shadow, and select a color. Format



Fine-tune drop shadow effects in PowerPoint by tinkering with the offset ond direction.



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the square as shadowed. Then choose Object, Shadow Offset, and tinker with the dialog box settings until the shadow looks right.

Add Embossing Easily

In earlier versions, PowerPoint made you jump through hoops if you wanted to create an embossed effect around text and objects. But Version 3.0 provides a shadow of fixed offset and direction as a menu option.

To emboss text, highlight it and select Text, Style, Emboss. For graphics, select the object and the menu options Object, Shadow, Embossed. The result uses prematched color schemes that discourage much experimentation, though you can change the fill color of an embossed object or text block. After selecting the Embossed option, pick a different fill color to vary the embossing effect. Note: Don't try to emboss text or objects on a white or black background—PowerPoint can't create a highlight paler than white or a shadow darker than black.

Avoid the Sound of Silence

After last-minute changes to transitions that use sound, make sure you turn off the Sound Recorder. If you don't, jingles that played without a hitch in Editing mode will be conspicuous by their absence when you run the slide show. Sound objects have no problem running while you're in Slides view, but Sound Recorder and the Slide Show program don't work so well together.

Align Columns Accurately

Don't rely on your eye to line up columns in Slides view—columns that appear to line up perfectly in Slides view may drift slightly when you run a slide show. This is usually because you have used spaces instead of tabs to line up columns, which PowerPoint scales on the fly so that the slide show takes up the entire screen. The point? You should always use tabs to line up columns, and always examine the Slide Show view carefully before your presentation.

KILLER

QUICK JUMPS IN SLIDES VIEW

Do you like the speed and ease of data entry in Outline view but want to see the full effect of your presentation in Slides view? Instead of wielding your mouse in Slides view once you've filled a field in your template, jump from field to field by pressing Chrl-Enter. Press this key combination in the last field on a slide to jump to the next.



DEVELOPMENT TOOLS

ORIECTVISION



Calculate Anniversaries Instantly

Don't include an AGE field in your database, since it will need to be updated frequently. Instead, include a Birthdate field, and compute ages based on that and the current day. To calculate a person's age, first place the birthdate in an ObjectVision field. Select Tools, Form to open the Form tool, then choose Objects, Field, name it BIRTHDATE, and place the field on your form. Select the field and click with the right mouse button to open the Properties menu. Choose Field Type, click on Date/Time, then click on OK, select the date formaty you want, and click on OK, select the date formaty you want, and click on OK.

Then choose Objects, Field, name the new field AGE IN YEARS, and place it on your form. Select this field and click with the right mouse button. Choose Value Tree, then choose Objects, Conclusion. Enter the following formula, and click on OK:

@INT((@NOW-BIRTHDATE)/365,25)

After closing Value Tree, click the right mouse button to bring up the Properties menu again. Choose Field Type, select Numeric, Fixed, and specify 0 decimal places. Then choose File, Close Tool to close the Form tool, You can test it by entering your own date of birth in the BIRTHDATE field. To use the AcE field with a database, link the BIRTHDATE field to a corresponding field in your database. ObjectVision will automatically calculate the are.

■ Use Buttons to Filter Data For Easy Views

To make your data easier to view, create a button to filter it so that your form shows only certain records. Then create a second button that provides access once again to all the records in the database. For example, use a filter button to show all the orders in the database ORDERS.DB that were received between specified dates.

First create fields on your data-display form to hold the filter criteria. To show records between



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two dates, add two date fields, STARTDATE and ENDDATE. Then choose Tools, Links, and select the database link to which you want to add a filter. Click on Modify to edit the link, Click on Options. choose Filters, and enter DateFilter in the Name box. To show only records with a date field that contains a date between STARTDATE and END-DATE, in the Filter Expression box type the line

@AND(@LINKVALUE("DATE")>=STARTDATE. @LINKVALUE("DATE") <= ENDDATE)

Click on Add to create the filter. Then return to your form

Place a button that activates this filter near the fields STARTDATE and ENDDATE to show only the records between these dates. Attach an event tree to this button that uses the click event and has the following conclusion:

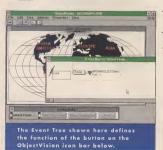
@TOP("LINKNAME") @FILTERACTIVATE("LINKNAME", "DATEFILTER")

Add a second button to deactivate the filter The event tree for this button should have the following conclusion for its click event:

@FILTERDEACTIVATE("LINKNAME") @FIELDCLEAR(STARTDATE) @FIELDCLEAR(ENDDATE) @CLEAR("LINKNAME")

@TOP("LINKNAME")

To use the filter, enter the appropriate dates in the STARTDATE and ENDDATE fields, then click on the button that activates the filter. The form will display records only between the two dates. To see all records in the database, click on the second button to turn off the filter and clear the criteria fields.



Create a Custom Icon Bar

For convenient access to frequently used buttons. create an icon bar that makes these buttons available from every form in your application. First, start a new form called IconBar. Place buttons. graphics, or text boxes on this form and assign event trees to them that carry out various functions when the buttons are clicked. Finally, resize the form so that it fits alongside or under the other forms in your application. Adjust the other forms' sizes so they don't overlap the IconBar form.

To make the icon bar available to all forms in the application stack, choose Properties, Stack, Event Tree, Then choose Objects, Conclusion, Specify the Open event, and in the Action for Application screen, enter the command @FORM-SELECT("IconBar"), Since ObjectVision always loads forms in the center of the screen, you will have to move the form each time the application is opened.

Combine Fields by Formula

Databases usually put first and last names in separate fields, but that leads to unattractive forms and reports. Use the concatenation operator to combine those values into one string. Create a field called FULLNAME and attach a value tree with the following conclusion:

+FIRSTNAME&" "&LASTNAME

(Replace FIRSTNAME and LASTNAME with the name fields on your form.) If the two name fields contain leading or trailing spaces, use the following expression in the value tree to ensure that only one space falls between the first and last names:

@TRIM(FIRSTNAME)&" "&@TRIM(LASTNAME)

TOOLBOOK



Control the ToolBook Window Size

To maximize the ToolBook window every time you open a book, attach the following handler to the book's script:

to handle buttonUp linkdll "user" int ShowWindow(word.int) get ShowWindow(sysWindowHandle,3)

unlinkdll "user" end

To minimize the ToolBook window, replace the 3 in the fifth line with a 6. If you want the ToolBook

that you can adjust to

four different angles.



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window to adjust itself to the exact size of the page as you open the book, use this handler:

to handle enterBook send sizeToPage

- Show or Hide Any Object

To switch an object or group quickly between hidden and visible states, use a line like the following in a handler:

set visible of button "Test" to not visible of button "Test"

If the object or group you specified is currently visible, this line will hide it. If it's hidden, this line will make it visible again.

Escape from the Reader Level

If you remove the Author menu item from the Edit menu, you might get stuck at Reader level with no apparent way out. Fortunately, it's not difficult to get back to Author level. If the command window is visible, simply enter the command SET SYSLEVEL TO AUTHOR to get out of Reader level. If the command window isn't visible, then start another instance of ToolBook. Choose File, Run, and specify any ToolBook book that will allow you access to Author level. In the new instance

of ToolBook, type the following line into the command window:

executeRemote "set sysLevel to author"

Close the second instance of ToolBook and return to the first. You should be back at Author level.

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VISUAL BASIC



at a time. To make a radia Customize Your Mouse Pointer

You're not limited to the standard arrow pointer in Visual Basic applications. Set the Screen. Mouse-Pointer property to any number between 0 and 12 to change the pointer. Each number represents a different pointer. For example, use 1 for the standard arrow, 2 for a cross hair, 3 for an 1-beam, 10 for an up arrow, or 11 for an hourglass, Here's a routine that changes the pointer to an hourglass, runs a time-consuming subroutine, then returns the pointer to its original state.

OldPointer = Screen.MousePointer Screen.MousePointer = 11 GoSub LongProcedure Screen.MousePointer = OldPointer

Manage Your Radio Buttons

To make a group of radio buttons exclusive and determine which button is currently selected, use a control array. First create a single radio button on



KILLER TIP

MAKE RADIO BUTTONS EXCLUSIVE

It's simple to make radio buttons mutually exclusive, so that anly one can be selected at a time. To make a radia buttan, select an ordinary button and chaose Object, Button Properties. Specify Border Styler. Radia. Create as many radia buttons as you need, then graup them together. Hald down the Shift key and select all the radia buttons, then choose Object, Graup. Place the following handler in the new graup's script:

to handle buttonDown
set sysLockScreen to true
set checked of self to false
end

The radio button that you click will automatically be checked when the ToalBook system receives a buttonUp message from it, and the other buttons in the group will be cleared at the some time. If you put a buttonUp handler in the radio buttons' group script, include the command FORWARD in it to ansure that the ToalBook system receives the buttonUp message.

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Fast Format – quick repetition of text formats	Yes	No	No
SmartMerge step-by-step mail merge guide with a card file data manager	Yes	No	No
Preview of professionally-designed Style Sheets for memos, faxes, letters, newsletters, etc.	Yes	No	No
WYSIWYG preview in File Open to quickly view, print, or extract text	Yes	No	No
Number of import/export filters (word processing, database, spreadsheet, graphics)	45	27	36
Grammar Checker	Yes	Yes	No
On-line Tutonal	Yes	Yes	No
Automatic re-numbering of lists	Yes	No	No
Colorful, customizable, editable, sizable Smartloons™ for one click access to your most frequently used tasks	Yes	No	No
in-context editing of drawings and charts	Yes	No	No
Laptop Install option for quick and minimal configuration on a laptop	Yes	No	No
Clean Screen option for total workspace oustornization	Yes	Yes	No

Competition.

Take a look at this chart and you'll see, featureby-feature, just how far Ami Pro 30 has leaped ahead of other Windows word processors. Which, not surprisingly, is why it's being hailed as the best word processor for Windows by respected and objective evaluators.

Ami Pro 3.0 takes top honors.

In fact, in recent tests' conducted by the National Software Testing Laboratories, Software Digest" (Vol. 9, No. 6, Sept. '92) gave Ami Pro 3.0 the highest Overall Evaluation in its category.

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Ami Pro 3.0. It's the one word processor for Windows that doesn't just invite comparison. It welcomes it.

otus. Ami Pro 3.0 Word Processor for Windows

your form. Select it, and choose Edit, Copy, Edit, Paste. Answer Yes when Visual Basic asks if you want to create a control array. To add more buttons, paste them in with Edit, Paste, and arrange them as you'd like them to appear on your form.

To determine which option button is selected, open the code window for the control array and enter the following code:

Sub Dption1_Click (Index As Integer)
WhichButton = Index
End Sub

Your program can now determine which option button is selected by checking the value of Which-Button. WhichButton equals 0 if the first option button is selected, 1 if the second one is, and so on.

Exit Windows Directly From Visual Basic

To shut down Windows from within your Visual Basic program use a simple application program interface (API) call. First, define the API function in your program's global code module. Switch to the global module of your program, and add the following command on a single line:

Declare Function ExitWindows Lib "user" (ByVal dwReserved&, ByVal wReturnCode%) As Integer

Have your program call this function to shut down Windows. To test the function, switch to your form and create a new button. Label it Shut Down Windows and double-click on it to view its code. Add the following line:

X% = ExitWindows(0, 0)

Save the project, then press F5 to run it. When you click on the Shut Down Windows button, Windows closes down all running applications and then shuts itself down. If a DOS application is still running, Windows displays the message "Application still active. Quit the application before quitting Windows," and then returns control to the Visual Basic program. If that happens, the variable X% will contain the value 0.

■ Manage INI Files Easily

Want to change settings in an INI file? A pair of Windows API routines simplifies access to WIN-INI, SYSTEM.INI, or any other INI file. First define the following two functions, typing each one on a single line in your program's global module:

Declare Function GetPrivateProfileString Lib "Kernel" (ByVal Section As String, ByVal Entry As String, ByVal DefaultEntry As String, ByVal ReturnedEntry As String, ByVal EntrySize As Integer, ByVal FileName As String) As Integer Declare Function WritePrivateProfileString Lib "Kernel" (ByVal Section As String, ByVal Entry As String, ByVal EntryValue As String, ByVal FileName As String) As Integer

To use one of these functions, first set up variables for the its parameters, then call the function with the variables. For example, to find the current setting of the Wallpaper= line in the [Desktop] section of WIN.INL use the following code:

FileName\$ = "MIN.INI" 'the l Section\$ = "Desktop" 'the s Entry\$ = "Wallpaper" 'the e Default\$ = "unknown" 'defau EntryValue\$ = Space\$(30) 'initi

EntryValueSize = 30

'the INI file to check
'the section to go to
'the entry to check
'default EntryValue\$
'initializes entry variable
'length of EntryValue\$

X% = GetPrivateProfileString(Section%, Entry%, Default%, EntryValue%, EntryValueSize%, FileName%) 'put this command on one line MsoRox "Your wallbaner is "+FntryValue%

If there are no errors, GetPrivateProfileString returns the current setting of the entry in Entry-value\$ and the new length of EntryValue\$ in X%. If it can't find the entry, X% will contain 0 and EntryValue\$ will contain the string specified in Default8.

To change the value of an INI file entry, specify the filename, section, and entry as in the above example. Put the new entry value in the variable EntryValue\$. Then use the following one-line command to change the entry:

X% = WritePrivateProfileString(Section\$, Entry\$, EntryValue\$, FileName\$)

If the command fails, X% will contain 0. Otherwise, the entry will be changed to the new setting and X% will contain a nonzero value.

KILLER TIP

GET BETTER API HELP

Visual Bosic's monuols don't offer much help on API functions, so get help from CompuServe's Microsoft BASIC forum CO GIS:MBASIC instead. For o text file detailing the syntox of all Windows 3.1 API statements, download W31API.ZPI he some information is ovoilable as a Windows help file colled VBAPI.HIP, stored under the name VBAPI.ZIP. For a Visual Bosic application that simplifies inserting API stotements, download APIX.EXE. Use APIX to select the API statement you want and specify its prometters. APIX capies the statement to the Windows Clipboard so you can paste it directly into your own Visual Bosic application.



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ADOBE TYPE MANAGER



▲ Keep Small Fonts Readable

ATM's small screen fonts—less than 8 points—are much elearer than Windows' own, but if ATM detects Windows' file of small screen fonts (Smallefon for VGA and Smallf.fon for 8514 displays), it yields to the Microsoft fonts every time. In the Control Panel's Fonts dialog box, scroll down to Small Fonts. Select Remove, and click on OK. ATM will now kick in with its own small font.

Update Your Font Metrics

Windows 3.1 added about 20 typographic characters to the Windows character set, but if you're running ATM, you need the ATM 2.0 upgrade to display them all. Even then, you may notice that some of the new characters, such as the ■ symbol (Alt-0137), are spaced irregularly onscreen. If that's the case, you'll also need to upgrade the font's PFM (Printer Font Metric) file. One update ontion is to delete the font's PFM file and reinstall the font from the ATM 2.0 control panel, Another option is to use Dennis Harrington's freeware PFMCnvrt utility to update your PFM files en masse, PFMCnvrt is available from the Adobe Forum on CompuServe, (At the CompuServe prompt, type GO CIS: ADOBE and download file PFMCVT.ZIP from Library 17.)

Troubleshoot Fonts More Effectively If you're troubleshooting font problems with Win-

If you're troubleshooting font problems with Windows, try disabling ATM. In Notepad or the System Editor, open SYSTEM.INI and find either or both of the following lines:

system.drv=atmsys.drv atm.system.drv=system.drv

Precede each of these lines with a semicolon and a space. This changes the lines to comments, so they are no longer executable. After these lines, insert the line

system.drv=system.drv

Next, check WIN.INI's Hewlett-Packard printer sections, and comment out lines that start with "softfont=" to remove the ATM Softfont information for that printer. Save the changes to each file and restart Windows.

NEWWAVE



■ Improve Fonts under NewWave

Don't like the font on your NewWave menus? Since they use Windows' standard fonts, you can opt for a better-looking menu through a quick edit of WIN.INI. To change to a serif typeface, for example, open WIN.INI in a text editor, scroll to the [Windows] section, and add this line:

SystemFont=Serife.fon

Experiment with other fonts, such as Seriff, fon, Sseriff, fon, Smalle, fon, and Smallf, fon—found in the Windows system directory—until you find the perfect match of legibility and style.

Impose Order with Startup Agents

Set up NewWave to execute an Agent task every time you start Windows. First, create and debug the Agent task. Choose Objects, Export Object to Disk, and copy the object to DOS with the name CBTTASK.SER. Place the task in the directory HHNWDATA.NWCBT. Create an empty file called HPCBT in the HPNWDATA directory so that NewWave runs the new Agent task. Use this Agent task to start additional tasks, such as installing programs on new users' desktops.

→ Manage Screen Clutter For Fast Redraws

Too many icons on the screen can slow down screen redraws. Solution: Change folders that contain too many objects. Open the folder, and select View, List by Title. If you've got too many unwanted tools on your desktop, select Settings, Manage Tools. Click only on the tools you want—NewWave hides the rest.

- Speed Agent Tasks

Tighten your Agent code to speed tasks and reduce the number of screen draws. For example, the task listed below—which changes the appearance of NewWard's Create a New facility—can be cut down by three lines. Remove the third, fourth, and sixth lines and this Agent task performs the same operation without opening the Create a New dialog box:



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Go ahead. Ask the boss if he's read your memo. He says, "Oh, sure, very interesting." Who's got time for long, wordy memos? Next time, make your point with DeltaGranh.

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TASK

FOCUS OFFICE "NewWave Office"

START CREATE A NEW

FOCUS CREATOR "NewWave Office"

CREATE TEXTNOTE "A Text Note Object"

CLOSE

FND ENDTASK

- Bridge the Gap Between Desktops

Standardize the look of desktops on multiple stations with NewWave's Bridge Builder, First, set up NewWave Objects, such as Microsoft Word documents and Quattro Pro spreadsheets, as you want them to appear, Select Settings, Application Attributes to customize titles, icons, and default directory startup paths, and click on Bridge Builder to copy all settings to a NewWave object.

Next, open the newly created Bridge Builder object, and choose File, Convert to DOS Files. This creates a NewWave installation file with the extension .IN\$ that can be shared among other users. Repeat this process until you have converted all Bridge Builder objects. Then create a file in your \HPNWDATA directory called HPINSTAL.-INS, and place pointers to the JNS files you just created. If you tried the Word and Quattro example above and copied the files to your A: drive, your HPINSTAL IN\$ file would contain the following lines:

A:\WINWORD.IN\$ A:\OPWIN.IN\$

When NewWave starts, it looks for the HPIN-STAL.IN\$ file-if it finds the file, it loads its contents into the desktop.

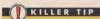
Size Your Screen Automatically On Startup

Onen NewWave with a maximized screen using an autostart Agent task, Select Objects, Create a New, and then click on the Agent button, Name the Agent WINSIZE, and click on the Create button. Enter the following lines to center your desktop on your screen:

TASK FOCUS OFFICE "NewWave Office" ADJUST WINDOW TO 1023 BY 658 AT (2.2) END

ENDTASK

Click on Create, and open the Task folder on your desktop. Drag the Sizer object into the Task folder, double-click on the WINSIZE task, and designate it an Autostart task, Next time you start NewWave, your desktop will appear as you like it.



QUICKER ACCESS BY SHARING

Get quick access to necessary documents without maintaining separate copies. To use NewWave's Share command, highlight an object, select Share, click on the desktop or on a new open folder, and select Paste. A copy of your document will appear in any folder

NORTON DESKTOP



- Speed Selection with Notepad

Avoid Notepad's cumbersome menus when opening existing files-create a Batch Runner program that opens a pick list. Select a file or category from this list and watch Notepad do the work, Select File, New in Notepad, and type in these lines, substituting your own data depending on your setup:

C+\AUTOFXEC RAT C:\CONFTG.SYS C:*.BAT C:\WINDOWS*.INI C:\DBASE*.PRG

Save the file as QUICK.TXT and select File, New. Then create a program file containing these lines:

:OUICK.WBT - Ouick List Launcher for Notepad NotePath = TextBox("Notepad Quick List". "C:\WINDOWS\OUTCK.TXT") Run("NOTEPAD.EXE", "") If NotePath != "" Then SendKey(StrCat("!FO",",NotePath,Num2Char(13)))

Save the file as QUICK.WBT, exit Notepad, and place an icon for the program on the desktop. First, click on the button of the drive containing

your file. Select the file, and drag it to an open space on the desktop-the name of the program will appear with the Batch Runner icon. Doubleclick on this icon to run the program.

- Save Time

With Incremental Backups

Don't waste unnecessary time in Norton Backup saving files. Set up an incremental backup to save only files you've changed since the last save. To back up only files with given extensions (such as DOC and XLS files), click on the Include button in the Select Backup Files window, and enter the specs. Open the program group that contains Backup, click on Backup, and select File, Copy to

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copy the file to a new icon in the same group. Select File, Properties, and name the icon Incremental Backup, Tab down to the Program/Document/Script field, and add the command-line option /Tl at the end of the existing program name. Double-click on the icon to open the Incremental Backup program.

▲ Get More System Information

Which applications hog system resources? Run SYSINFO and click on the memory chip button for a bar chart of Windows' use of memory. (Bars



Identify memory hogs: Norton Desktop gives you a graphical representation of your system resource allocation.

represent device drivers, fonts, and so on.) Click on a bar for a list of tasks and how much discardable and nondiscardable memory each uses. Discardable memory can be regenerated from disk; nondiscardable memory drains system resources for a whole Windows session.

Quick-Launch Favorite Programs

Add a menu item to launch the programs you use most. Select Configure, Edit Menus, then click on Save As to copy the original menu. Click on Custom, and check the New Menu radio button. Type Programs in the Text box, and click on Ok. Highlight Programs, click on Custom, and choose New Command. Enter the program name you want to add to the list under Text, and type its path and program name (or click on Browse to find the executables). Click on Options, and enter the path for a startup directory. Choose the state you want this application opened to—Normal, Maximized, or Minimized (set a password if you want). Repeat the process for all the programs you want to add, and test to be sure each entry works.

Configure ND Painlessly

Associate common file extensions with an application to easily configure Norton Desktop. If you use the file extension. FIL with Ami Pro, open WIN-INI in a text editor, and add this line beneath the [Extensions] portion of the file:

fil = C:\AMIPRO\AMI.EXE ^.FIL

Click on the button of the drive that contains your files, double-click on any file, and watch the program load. Add frequently used files to your desktop—just drag the file from the file list to free space on your desktop.

Get the Best Desktop Editor

Norton's Desktop Editor beats the System Editor and Notepad hands down. If you use multiple doument windows, search and replace, file searches, and file comparisons, make it the default editor for INI, TXT, and BAT files. Select Configure, Default Editor, and enter DESKEDIT.EXE at the prompt.



KILLER TIP

CONTROL YOUR ICONS

Are your icons so cluttered that you can't moke out their tilles? Unfortunately, the Windows Control Ponel fixes only horizontal spacing, But you can toke control of horizontal and vertical spacing with this Botch Runner program. First, open Batch Builder, and enter these lines:

[Wrap + 1 Title Wrapping]
[IH#]Horizontal (32-512 Pixels)
[IV#]Vertical (32-512 Pixels)

Save this file os ICONS.WBD—it will serve as a templote for o check box doto-entry screen. Next, select File, New, ond enter these lines for the program itself:

IH = WinPamGet(6)

IV = WinPamGet(13)

Wrap = WinPamGet(14)

DialogBox("Icon Spacing", "ICONS.WBD")

WinPamGet(6, StrTrim(IH),3)

WinPamGet(14, Wrap, 3)

WinPamGet(14, Wrap, 3)

Sove this file as ICONS.WBT in the same directory os ICONS.WBD. Select Tools, Test to run the program or ossign it to a Norton menu. Note: This technique works only if ND is not running as a shell, since its icon-specing coptions supercede those of Windows.

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BUSINESS TOOLS

COMMENCE



Print Schedules Automatically With Agent

Commence comes with an Agent designed to print out a weekly appointment report that spans from Sunday through Saturday, but you can modify it to print just weekday appointments. To do so, select Define Agents, locate Print Next Week's Calendar in the Agents list box, select Edit, select the A button in the Then Perform These Actions box, select Print Options, and substitute Monday and Friday for Next Sunday and Next Saturday, respectively. Close out of the dialog boxes, save the new Agent, and return to the current view. Run the Agent, and rolly weekday appointments in the selected range will print.

Access Other Windows Applications Easily

You can access your favorite applications easily by adding an Agent that launches the application from your toolbar. To create an Agent to launch an application, select Define Agents from the Agents menu, click on Add, and select the trigger button (T). In the Trigger Type list, select Command Bar Pick and choose an ioon for the toolbar in the Button drop-down box. If you want, you can also specify the position on the toolbar.

Close the new Agent dialog box and click on the A button in the Then Perform These Actions box. Now choose Application Launch in the Agent Type list, and use the Select button to browse for program files. To launch Excel, for example, specify CMEXCELEXCELEXE in the Run box. Click on OK, save the file, and dose out of the current view. The new icon appears on the toolbar.

Find Uncompleted Items Quickly With Filters

Use Commence's filter to make sure that all of the items in a category are completely filled in. For example, to search for category items in which the Notes text field is blank, select Simple Filter from

the Options menu, choose Notes in the Fields box, and select the By Field Value button. In the dialog box that appears, select the Does Not Contain option, and type? (the wildcard character) in the text box to tell Commence to show any items for which Notes is blank.

Choose filter types according to the type of field you're searching for. You'll need Simple Filters to search on a single condition and Multiple Filters to search on up to four conditional statements. If you want to find all the blank telephone numbers in a field, for example, select Multiple Filter from the Options menu and click on the button that says Select #1. Then select Date from the Fields box, select the By Field Value button, and in the dialog box that apnears, select the Before oution.

In the text box, enter a date after which you have no scheduled appointments, such as 0.1/01/2001 (January 1, 2001), then select OK. Now select the check box labeled Not, which is to the left of the Filter #1 box. When you select OK, the view will show you only those items that have empty date fields.



Commence makes it simple to adjust your item-detail layouts to accommodate the way you work.

Customize Forms to Speed Data Entry

Arrange your item-detail layouts in whatever urrangement best facilitates data entry. Select the form you want to modify from the Views menu, and double-click on an item to open the item details. Select Layout from the Options menu to open the Arrange Detail Form window, and arrange your fields by dragging them into position. Select Rearrange to have Commence space the fields correctly, and click on Save Arrangement. You'll have the same format every time you open the form.

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Over 18 million people use some version of Lotus" 1-2-3" every day. They depend on it. They trust it. They know it. Which is why, if they're moving from DOS to Windows," they're moving to 1-2-3 for Windows...for some very good reasons.

They know that *only* 1-2-3 is fully compatible with 1-2-3.

Only 1-2-3 for Windows is able to read and execute every 1-2-3 for DOS file, style and macro. Which means you can preserve your full investment in 1-2-3 for DOS files when you move to 1-2-3 for Windows. And only 1-2-3 for Windows—with its built-in Classic* Menu—lets you use all your familiar 1-2-3 commands.

They know that 1-2-3 offers the *best* 3D technology.

Only 1-2-3's 3D technology gives you easy access to 256 worksheets and lets you build 3D formulas just like you do in 2D. Which ultimately makes consolidating, comparing and analyzing data much simpler. In comparison, Excel's Workbook" is a limited imitation of true 3D. And while working in Group Mode in Borland's" Quattro? Pro for Windows, simply cutting a range of data in one sheet unfortunately means you'll delete the data on every sheet. And what's worse, you can't undo it. All of which means if the analytical power of 3D technology is important to you, 1-2-3 is still the best choice you can make.

They know that 12-3 for Windows now includes the *most* asked-for enhancements.

The new release of 1-2-3 for Windows Release 1.1 includes a number of performance enhancements. For example, it's now the fastest Windows spreadsheet for printing on PostScript printers. And it's also the fastest to launch. We've also added over 25 innovative new features. usability enhancements and GUI development tools. The result? 1-2-3 for Windows is now more powerful and easier to use than ever before

They know that 1-2-3 for Windows offers unmatched database capabilities.

It's true. If you're a spreadsheet user who needs to access external databases, I-2-3 for Windows remains unmatched—particularly if you need relational capabilities. In fact, Corporate Computing (August 1992) recently wrote that "for the experienced I-2-3 database user, I-2-3

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for Windows with DataLens is the front-end tool of choice."

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LOTUS ORGANIZER



Personalize Organizer's Main Screen

You can personalize Organizer by placing your company logo on Organizer's opening screen. To add a graphic called NEWLOGO.BMP, for example, open ORGANIZE.INI in an ASCII text editor, and add these lines:

[TITLE]
Logo=C:\ORGANIZE\NEWLOGO.BMP
FitToPage=1

Specify the correct path and filename of your image, then restart Organizer. The FitToPage setting tells Organizer to size your graphic to fit in the image window. An easier way to add an image

PCComputing

An Organizer of one's own—just add your company logo or another image to the opening screen.

is to open the graphic in an image editor, such as Windows Paintbruah. View the image full screen, and hit the PrintScreen button on your keyboard to copy the contents to the clipboard. You may need to press PrintScreen twice on some keyboards. Open Organizer, hold down the Shift key, and select Paste from the Edit menu—Organizer will place your image on the title page. Also try holding down Ctrl-Shift while selecting Edit, Paste to delete a page's text box; Alt-Shift Edit, Paste to size the graphic into the allotted space; or Ctrl-Alt-Shift Edit, Paste to size the graphic into the allotted space; or Ctrl-Alt-Shift Edit, Paste to make the properties of the properties of

Set up an Applications Launch Pad by taking advantage of Organizer's ability to form links with other Windows applications. Set up a Notepad

page called Launch Pad that will contain all your applications, and define its Type as Links. Click on OK, the Anchor button, then the Notepad page. Select Reference from the File menu, and type in the name of the appropriate application and path, or use the Browse feature to find a program file. Click on OK to establish your link. Repeat the process for all your Windows applications, and you'll have a single Notepad page dedicated to launching programs.

Quick Dial in Organizer

Organizer's drag-and-drop capabilities make dialing phone numbers a snap. In a To Do list, set up names and numbers with any dial-out prefix you need—for example, call Bill at 9,555-1234. When you want to dial the number, simply drag the to-do entry to the phone button. Click on Dial in the dialog box, or modify the settings if necessary.

KILLER TIP

START UP WITH THE MOST USEFUL FILE

Create a file set to your specifications, save the settings, then specify this new file as the default as that your customized settings will appear every time you create a new file. First, create a file, then change colars, tob settings, and Smartlcans, and save the file as NEWFILE-ORG, for example. Use an ASCII text editor, open ORGANIZE.INI, and add these lines beneath the [Settings] parties of the file:

Default=C:\ORGANIZE\NEWFILE.ORG

The next time you create a new file, the new default will appear.

MICROSOFT PROJECT



Customize Project Menus

Project gives you complete control of your menus. To add a cost-analysis table to your menu, for example, select Table, Define Tables, and cliek on New. Name the table C&ost Analysis (the ampersand marks the active and underlindel elter in the menu), click on the drop-down list button, and select ID. Move down one cell, select ID, and repeat the process for Name, *Work Completed, Planned Cost, Actual Cost, Remaining Cost, and Cost Variance. Click on Show in Menu, OK, Set in



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© 1992 Mitsubshi Electronics America, Inc. All trademarks or registered trademarks are the property of their respective holders. Actual unretouched screen image produced from Modern Medium Inc. (RenderStar 2). order to add the field to your menu.

Remove unwanted table definitions to clean up your menus. Select Table, Define Tables, select the definition you want to remove, and click on Edit. Click on the Show in Menu check box to toggle it off, and close the dialog boxes.



KILLER TIP

EASY ACCESS TO CRITICAL PATH REPORTS

One of the most requested reports in Project is the Critical Path report. Create a toolboar button that filted critical path information and lets you select how you want to view it. Select Mocro, Define Mocros, click on New, nome the mocro Critical Report, and add these lines in the mocro definition field:

Filter .Name=[Critical] // .Highlight=[Yes]
.Value1=[] .Value2=[]
Macro .Name=[Format Report]

Click on the Commands button to help with syntox, and click on OK, and close the diolog box. Next, hold down the Cirl key, click on an unused button, and the Button Definition diolog box will appear. Edit the button with the icon editor or choose on image from the picture library. Select Morar [Cirlical Report] from the Commands drop-down list box, and close the diolog box. Hold the Shift key and drag the button into place. Project outbromically spaces the buttons.

Hide the Time Display To Save Space

Displaying dates of tasks without the time of day will help save space and allow you to fit more data onscreen. Select Options, Preferences and choose Date Format. Then click on the drop arrow and select an appropriate date format. Double-click on a Gantt chart date to change the Timescale on the chart, then select the date units you want to view.

Combine Projects to Generate Reports Easily

Complete projects are often made up of several smaller projects. To combine a group of related projects into a single report, open all the projects you want to merge (up to 19). Choose Window and New Window. Then, while holding down the Ctrl key, select the projects you want to merge. Click on UK, and Project generates a Gantt chart of all your projects. Sort, filter, view, and print the reports as necessary.

PACKRAT



Browse Item Details Quickly

PackRat offers a nifty shortcut for browsing the details of items on your lists. Open an item by highlighting it and pressing Enter. Then hold down the Ctrl key and press Page Up or Page Down to move through your list, viewing the details for each entry one at a time.

Quick Dial with a Button Click

Create PackRat buttons to dial your most frequently called numbers with a single mouse click. Create a Phone Book entry by selecting Add, Phone Book. Then, create a search catalog for this phone entry. Select Search, Phone Book, and fill in the search criteria that PackRat will use to find this entry. Then click on the Add button, and give your search a name. Select File, Preferences, Dial Info to set up your dialing parameters, and be sure to check the Use Modem to Dial box.

Next, create a button to add your entry. Select Options, SmartButton Assignments, choose an Undefined button from the list, and click on Define. Enter a description for the new button, select Phone Book from the Change to Faelility drown list, and select the catalog you defined in the search using the catalog drop-down list. Select Speed Dial from the Action list, and click on OK. Optionally enter a new button picture, and close out of the dialog box. Click on the new button, and PackRat will dial the number.

- Quickly Search for an Item

Set up quick searches in PackRat to list tasks Overdue and In Progress. First, click on the Today Box—the gray box that displays the current date—and select Options, Define Today Box Search. Then set your search criteria for the left and right mouse buttons. For example, choose Phone Book, Phone Log, and Index Cards as the criteria for the left mouse button, and choose To Do's for the right mouse button. Click the appropriate mouse button on the Today Box, and PackRat will perform the search.

PackRat files periodically become too large, making your searches sluggish and wasting preclous disk space. Clean up your files by running the Compress utility, which repairs damaged data files and recovers space taken up by deleted records. First, make a copy of your data files by selecting File, Offload, and entering the appropriate inforIf you need to communicate something clearly, say it more than once,



say it more than once,



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mation. Then select File, Close to close any open file, and select Compress File from the Utility menu. Finally, choose the PackRat file that you want to compress, and click on OK to perform the operation.

- Set Appointments Fast

Quickly set up an appointment by clicking on the appropriate date in the PackRat calendar, then double-clicking on the To Do, Agenda, or Project Manager icon. PackRat automatically opens the facility and fills in the correct date. Launch a search on the facility by right-clicking on the appropriate icon, and add a new item to it by doubleclicking on the icon.



PERFORM PRO



■ Save Time with Scanned Forms
To design a form easily, scan an existing form into
PerForm and let the software do the work. Set your
scanner to a medium resolution, such as 150 dots per
inch—resolution wort matter in the final form—and
scan the form. Open PerForm, and press Ctrl-W to
display the form onscreen. Use the Graphic tool to
create a graphic image that covers the entire page.
Double-click on the image you just created to display
the Graphic Attributes dialog box. Select Seale by
Factor, and click on Values. Ensure that the values
for X and Y scales are both set to 1.00, and click on
OK to close the dialog box.

Next, choose the Select File button to choose the

graphical format you want to use—PC Painbrush format, for example. Select the appropriate filename, and click on OK to return to the Graphic Attributes box. Select Traceable, Grayed and close the dialog box. With the image of the form displayed onserven, toggle the image on and off with the FS key to see how your work is progressing. When you're finished, delete the graphical object to keep the form size to a minimum.

Open Forms Automatically

Set up an icon that will open directly into your most frequently used form. First, open the group in which you want to place your new icon, and select File, New Item. Enter a unique description, tab to the Command Line field, and enter the complete path of the PerForm program followed by the form you want to open. For example, to open PerForm with the form INVOICE.FRP, enter the following in the Command Line field:

C:\PERFPRO\WPERFILL.EXE C:\FORMS\INVOICE.FRP

There's no need to specify a working directory since it's included in the Command Line.

Quick Check on Available Resources

Not all forms are created equal. Press Ctrl-2 (don't use the numeric keypad) to see how your form impacts system resources. You'll see information on the version of Windows you are using, the number of objects in your form, the memory used, the global memory free, and the local memory free.

QUICKEN



▲ Customize Fonts for Easy Viewing

Quicken's transaction register can be difficult to see on some monitors. Increase the font size of the register to more easily enter your transactions. Use an ASCII text editor to open QUICKEN.INI, located in your Windows directory, and add the following line in the Quicken section of the file:

Fontsize=12

Quicken uses a default font size of 10 points; adjust the font size accordingly. Close Quicken, then restart the program. The new font size appears in all registers.

Print Reports in 1-2-3 Format Easily Quicken offers no simple procedure to export account data into a spreadsheet—but you can print a report in 1-2-3 format. Select Reports, choose a

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form, and set the date range-Quicken displays the form onscreen. Click on the Print button, and select 1-2-3 format from the dialog box. Type in the name of the file, and follow the prompts.

Zoom In on Graph Data

When viewing Quicken for Windows 2.0 graphs you can get data from as far back as the transaction register. Right-click on a bar chart or pie graph, and the value will appear in a window. Shift-click on a pie, and Quicken hides the slice, Double-click on a graph pie, and Quicken singles out that category and zooms you to a bar chart. Double-click on a bar, and a comparison pie chart appears. Double-click on a pie or bar of the new chart, and Quicken whisks you to the data in spreadsheet form, Double-click one more time, and Quicken opens the transaction register, where you can add or modify transactions.



Examine your data from every angle: Quicken lets you switch between views and formats instantly.

The following contributors made this compendium possible: George Beinham, Paul Banner, Shane Devenshire, Mike Falkner, Scat Finnie, Nathan Garcia, Prestan Gralla, Christine Grech, Matthew Lake, Lydia Lee, Dale Lewallen, Larry Marina, Sally Neuman, Jack Nimersheim, Hillary Rettia, Derrick S. Shadel, Jahn Shumate, Gina Smith, Jan Smith, Jahn Taschek, Dylan Tweney, and Bab Weibel.

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THUE

OS/2 BOOSTS YOUR PRODUCTIVITY IN HUNDREOS OF WAYS, HERE ARE THE FIRST 100.

here are at least 100 reasons to consider OS/2®. They range from the substantial (the ability to solve complex problems with information that originates from multiple sources) to the sublime (it looks cool and is fun to use). In between, this enterprise-

strength operating system brings both large and small benefits to anyone who uses a PC: OS/2 guides you into new computing territories instead of confining you within the boundaries of older technology.

On the following pages, we list 100 of the most exciting aspects of OS/2 today. This is just the beginning.

THE (\$ 2100

OS/2 HAS ARRIVED

OS/2 IS HERE, NOW

month, six months or a year, It's here. For real,

The greatest advantage OS/2 has over

its perceived competition is the fact that

it is available now. Today. Anyone who

wants to gain 32-bit personal comput-

ing power can buy a copy of OS/2 and install it on their machine. There is no

waiting. There are no lines. There are no promises about something that will arrive in a

The OS/2 Tutorial, accessible

from the Information Folder,

leads the new user through a

step-by-step primer on the

most important highlights of

OS/2. Browsing through the

Tutorial in the beginning can

save time later.

desktop, mobile and network. Whether

on one desktop or connecting to many, data transfer is easy, and

you only need to learn one computing style—or language—to deal with all the information that you face during any computing day.

OS/2 PROTECTS
YOUR PERSONAL
COMPUTING
INVESTMENT

The first step in designing a computing environment

is to determine the task, that needs to be accomplished and then select the software that completes the task. The next step is to procure the machines—and the operating system—on which the applications will operate.

These choices, however, are always a lot harder than they sound. Nobody uses just one program to perform a sinbut doesn't change your workstyle.

OS/2 is the best platform for the new and exciting applications that take advantage of the previously incharted 32-bit landscape. So you can continue to use WordPerfect for DOS under OS/2 and adopt exciting 32-bit applications like Lotus cc:Mail for the OS/2 Work Duce Shell.¹⁹

OS/2 IS EVERYWHERE
After OS/2 was released, there

After US/2 was released, there didn't seem to be enough copies to go around. People who heard about OS/2 and wanted to take it on a test drive had trouble getting a copy. This is no longer the case. OS/2 is available through all the most convenient retail and direct channels—essentially everywhere that better software is sold. And if you have trouble finding a copy of OS/2 in your neck of the woods, you can always contact BM directly, by calling (300) 3IBM-OS2 (342-6672), (In Camada, call (800) 465-7999)

ONE OS/2 SIZE FITS ALL

People—from the most naive beginner to the busiest expert—need a varierly of computers. As these needs converge, people may try to engage two or more machines to complete all their computing tasks. To add to the confusion, some vendors sell (or will sell) one operating system for the end user and another for networks and power users.

FIRST THINGS FIRST

OS/2 offers a system that is intended to reach across these boundaries and provide enterprise-strength functionality. It supplies beginners with ease-of-use and brings hardever power to the most technical users. And while there are uninimum hardware requirements for OS/2, they do not exceed those for the muiority of the PCs sold to

day. So OS/2, in its standard configuration, is suited for everyone: From the person with a 16 MHz 386 SN to the MIS director of a large bank. As user's needs evolve, IBM will offer specific versions of OS/2 for different platforms all running across the computing enterprise while using a common operating environment.

OS/2 IS FLXIBLE

Anyone who uses a PC today deals in multiples. Central information originates from several diverse sources. It is fikely you work with a variety of applications at work, at home, on the road and on the network. As a result, you can't settle for anything less than flexibility and portability.

OS/2 performs well in any of the three primary computing environments: S OS/2 Tutorial

Enter.

Welcome to the OS/2 Tutorial. If you are unfamiliar with OS/2 2.0, it is recommended that you view the entire Tutorial.

To continue, place the mouse pointer on the Next push button located at the botto of the window and click once, or press



gle task. Instead, they are using several different packages to accomplish disparate functions. Some software may be obsolete but is not replaced because of a personal, personale of financial investment. Or it's not replaced because it still does the job. In either case you can benefit from OS/2, as it supports the most important past and present application software programs and will continue to does in the future.

OS/2 IS EASY TO LEARN, USE AND ADOPT
OS/2 protects your existing soft-ware investment by bringing older products under a new umbrella. It is easy to learn and use, with little training (or retraining) remained. So if you have a

large team using WordPerfect* on 386-

25 PCs, adding OS/2 increases power

SO YOU'RE NEW TO OS/2?
"START HERE" FOR
AN EASY PRIMER

When you first install OS/2, you will notice a Desktop icon—a target with an arrow pointing to its center and labeled "Start Here." Please do. This begins an easy-to-use primer on the most common OS/2 commands and functions. It consists of two and functions, it consists of two disciplinations on the right. Double clicking on a topic brings up serollable information. telling you all you need to get started about that particular assect of OS/2.

While it is true that OS/2 is generally intuitive, taking fifteen minutes or to browse through the Online Tutorial—contained in the Information Folder—can build a deeper knowledge of the system and save time later.

OS/2 PRO-VIDES A FAST PATH TO HELP

OS/2 offers continuing education. Just as the tutorial is for beginners, the system's online. context-sensitive help component provides continu-

ing OS/2 educa-

tion, Access "Help" (a single right click on any object) by selecting it from the pop-up menu of any application, or hitting the universal F1 key. And the Master Help Indexanother Desktop object-is an alphabetical, hypertext-driven list of every element of the system.

And the best news is that the breadth and depth of the online system makes those big-dustgatherers, "Documentation Manuals." obsolete. The thorough. easy-to-access online help system gives you the information you need when it is needed. So you will never be stuck

OS/2 IS A POWERFILL OPERATING SYSTEM

32-BIT OPERATION ENHANCES SPEED AND PERFORMANCE lucreased speed is the most visible and tangible improvement of a 32-bit system, so it tends to be the first thing that a new OS/2 user will notice. To just say "it goes faster." however, is to tell only part of the story. 32-bit operation provides a wider data path and more efficient memory usage, which changes the way the computer and the software interact.

A 32-bit data path relieves the existing 16-bit memory bottleneck, increasing the overall data transfer rate. This meets the demands of modern processor-intensive applications-at their most demanding on the network server-and provides a clearer path for the manipulation of bitmaps. graphics and numerical data. Developers of 32-bit applications gain access to a large "flat" memory model of up



Search topics... Print topic

Selecting windows from Window List or from the res folder enables you to switch to windows for open objects and active programs.

By default, all your program objects appear in the Minimized Window Viewer folder on the deskton.

To switch to a running program using the Minimized Window Viewer:

Previous Search ... Print .. Index

A 16-BIT APPLICATION BENEFITS FROM THE

32-BIT ENVIRONMENT 32-hit programs have special speed and function characteristics. They use memory and resources more efficiently, and they provide a more hospitable development environment since the programmer has fewer memory restrictions. While a 32-bit operating system does not change the structure or the operation of a 16-bit program running under OS/2, the 16-bit program can still benefit from an efficiency boost

Also, OS/2's inherent Crash Protection prevents a misbehaving 16-bit application from invading the individual memory space of other programs-DOS, Windows* or OS/2-running at the same time.

to 512 MB, where they don't need to worry about restrictive segmented architecture that 16-bit programming environments force upon developers. This means you will see more flexible and powerful applications arrive for OS/2 that take advantage of these new capabilities. And these new programs will include unprecedented speed and efficiency.

TIP: INFINITE VIRTUAL Under OS/2, you can have up to 240 virtual DOS and Windows* sessions. Here, you can tweak individual DOS or Windows sessions with a custom configuration that governs that session and makes any startup changes needed to get the most out of a DOS or Windows program.

HELP AS NEEDED

The Master Help Index-a default OS/2 Desktop object-offers an online, indepth guide to all of the OS/2 system functions. This alphabetical, hypertext-driven module gives you immediate access to information when it is needed the most

OS/2'S MULTITASKING LETS YOU RUN SEVERAL POWERFUL PROGRAMS

Today's users want their operating system to allow them to perform multiple. simultaneous activities so they can get the most out of their time at the computer. A fully pre-emptive multitasking environment. OS/2 is able to run several concurrent functions while making foreground applications. more responsive to the user. This differs from the cooperative multitasking mode used by Microsoft Windows, which requires applications to relinquish control of the processor. This can be inefficient When Windows executes a background print command, the foreground spreadsheet recalc can take much longer.

Under OS/2, the recalc and the print joh run simultaneously and you can even begin a third, fourth or additional task. And as people want to do more with desktop PCs-exchanging information, running data searches and printing long documents are only the beginning-they need true multitasking power to support them.

> MULTITASKING CHANGES HOW YOU WORK, BECAUSE YOU NO LONGER HAVE TO WAIT

There are a lot of little jobs that slow down your day: Sending or printing a file. Formatting a disk, Installing software. Copying files from one directory to another. Running a database search. In any of these cases the tendency is to issue the command and then take a coffee break, read the newspaper or return your phone calls until the job finishes.

THE | \$ 2100

OS/2, however, doesn't make you wait. You can stick a disk in drive A and issue the "format" command, then continue working on a document or spreadsheet. Where the tendency was to store at the cursor for a minute or two as it changed to and from an hourglass, you can now switch tasks. This time can be spent more "productively." on a spreadsheet or a document orif your system is connected to a second modein-another upload or download. This will change how you perceive the computer, as you are no doubt accustomed to sitting at your desk and waiting for the PC to finish its job.

TIP: A HANDY TASK LIST Unlike Windows, the Os2 default configuration doesn't show minimized icons directly on the Desktop. But you can find out exactly what applications are running at any time, one of three ways:

 On the Workplace Shell, click both the left and right mouse buttons simultaneously to call up the Window List.

 From within any application hit Ctrl-Esc.

 Select the Minimized Window object on the Workplace Shell, for an iconic view of all open applications.

Then, to switch to any task from the Window List, double click on the application name. In the Minimized Window object you just double click on the preferred icon.

MULTITHREADING ALLOWS
APPLICATIONS TO WORK
BEHIND THE SCENES
Just as a multitasking PC

an run several applications concurrently, an application capable of multithreading can execute simultaneous internal functions. Each function—like printing or spell checking on a word processor—uses a separare "thread." This means that you'll be able to work more efficiently with your application, putting many functions to work for you at the same time. So the repagination of a large document won't cause a work slowdown, as each thread performs is task independently. Multithreading is especially useful in communications packages, where concurrent functions help to speed the data flow. In fact, an OS/2-equipped machine could send material through one serial connection and receive through another, and still allow another task to be completed.

Imagine a spreadsheet that can recal and revise at the same time, or a database that will simultaneously update and search. This saves time for users. And multithreading is a valuable tool for developers of all types of application programs.

TIP: ENDLESS CLIPROARDS OS/2 gives each WIN-OS/2 Full Screen and every OS/2 session its own clinboard. Clipboards can be shared, or made "Public" across the entire OS/2 system to share data between WIN-OS/2 (OS/2's implementation of Windows functionality) and OS/2. Only "Private" clinboards can be used in the current session, but making clinboards Private in WIN-**OS/2 Full Screen sessions increases** the speed of Windows cut-andpaste operations. Use the Options menu for the Clipboard.

UNDER OS/2, YOU CAN BOOT INTO DIFFERENT ENVIRONMENTS

With OS/2's dual boot and boot Manager features, a single PC can operate two or more operating systems, increasing the range and the versatility of the machine. With Dual Boot, you are given the choice of all options at startup. If you don't respond at a predetermined interval, the machine will spart the last operating system used.

OS/2 contains DOS and Windows functionality, essentially providing three operating systems in a single box, so Dual Boot won't be necessary for most users. But in special cases—like a developer who may want to use the same machine for everyday work with OS/2 (operating system #1) and a unique development with NENIX(operating system #2)—the Dual Boot feature could eliminate the need to buy a second PC.

RS/2 IS THE INTEGRATING PLATFORM While you can configure an OS/2 machine to boot into any version of DOS or Windows* von can run several versions as OS/2 tasks. For instance you can run a Windows 2.x application as one task and a Windows 3.0* application as another. Or you could run separate windows that support different versions of DOS. This extends the versatility of the machine even further, allowing you to run almost any version of any PC software program that has

An incredible value: this support for OS/2, Windows, and DOS applications is all included in OS/2: you don't have to buy DOS or Windows to get it.

TIP: FASTER, FASTEST the Bread is important when running DOS or Windows programs, use the DOS Full Screen or Win-OS/2 Full Screen choices in the Command Prompts folder rather than their "windowed" siblings. The DOS or Windows applications will run faster if they have the screen real estate all to themselves.

Also, if you have any DOS print spoolers or the Windows Print Manager* installed, disable them. Rely on the built-in, system-wide OS/2 print spooler instead.

OS/2 IS BUILT FOR TOMYS HARDWARE
The evolution of graphical environments has increased the power of the average PC. As a result, OS/2 works on any Intel*-comparise 182-bit processor (380, 480 and above) and will run well on any chip that runs at 16 MHz or higher, As for video, OS/2 looks great on any standard VGA, offering a crispness and clarity that is unmartched by other graphical software, and it takes great advantage of higher-resolution systems.

OS/2 DOES WINDOWS

OS/2 is now the only PC operating system you need to run all of your favorite applications Now under the umbrella of the ultra-stable 0S/2 environment, you can securely run your favorite Windows applications and utilities.



The OS/2 system, with all options installed, takes up more space than Windows or DOS, Two factors make this less severe than it may sound: The industry-standard PC now comes outfitted with 120 MB hard disks and above. And the full OS/2 installation provides for the complete functionality of DOS and Windows: So 30 MBs actually accommodates three different operating systems, although the OS/2 system can be installed on as little as 15 MB.

TIP: THE OS/2 COMMAND PROMPT CROSSES OPERATING SYSTEM BOUNDARIES The OS/2 Command Prompt, accessible either in a full-screen configuration or in a window, can immediately launch any program regardless of its origin. So you can type a DOS. Windows or OS/2 command, and the system will just

load the program. For instance, if

you want to launch a word proces-

sor like Ami Pro* from the DOS

command line, you need to type

"WIN AMIPRO," Under OS/2, a

simple "AMIPRO" will do. 05/2'S SUCCESS CROSSES BRAND-NAME BOUNDARIES From IBM Personal Comput-

ers to "homegrown" clones. OS/2 is constantly being evaluated for compatibility. This has led IBM to state that OS/2 will work with your Intel 386 SX or higher system—PS/2 not required. OS/2 thrives on any machine with enough juice, be it ISA, EISA or Micro Channel.

EISA and Micro Channel offer great advantages, and both offer performance improvements beyond those available in standard machines. Both are better equipped to handle multiple serial communications devices. And, as they use a separate bus for many tasks, they can be a better environment for multitasking activities

IBM's hardware compatibility testing checks 18 key functions of OS/2 on a variety of personal computer hardware systems. Compatibility testing extends beyond OS/2 itself and into OS/2 Extended Services, Distributed Database Connection Services/2, OS/2 LAN Server and OS/2 LAN Enabler. To date over 400 configurations have been verified as compatible with OS/2. Test results on various models are continuously updated and available from IBM OS/2 dealers.

as well as through the online services CompuServe* and Prodigy*

OS/2 MAKES GOOD USE OF MEMORY As personal

computers continue to take on the tasks formerly in the domain of mainframes and minicomputers, Random Access Memory, or RAM, is another area where more may never be enough You may need to add memory to your PC to run OS/2 (or even less productive operating systems). A minimum of 4 MBs of RAM is needed for the system to function, while 8 MB is enough memory for OS/2 to provide the industrial-strength support corporate users demand

There is no practical limit to the amount of RAM that OS/2 can use as the system is capable of addressing up to 2 gigabytes of virtual memory and more than 16 MB of physical memory. As graphical applications become more popular, the amount of RAM required for spry operation will increase. In a few years, it won't be uncommon to find PCs with 6+ MB of RAM-essentially mainframes on the desktop, OS/2 is ready for this challenge.

OS/2'S MEMORY MANAGEMENT GIVES THE USER MUSCLE

Users accustomed to jumping through memory management hoops will be pleasantly surprised by OS/2, as they can take advantage of built-in DOS memory management. Tuck TSR (Terminate and Stay Resident) programs neatly out of the way by using the LOADFIIGH command within DOS. If you really want to push the envelope, OS/2 will give each program up to +8 MBs of combined XMS/EMS memory, and up to 512 MBs for each application written to the DPMI specification.

Additionally, OS/2's virtual memory manager treats hard disk space as if

One category of software

OS/2'S MEMORY MANAGEMENT FLIMINATES THE RAM CRAM

clearly not needed as a supplement to OS/2 is memory management utilities, as they are already an integral part of OS/2's 32bit architecture.

OS/2 shatters the 640K barrier permanently with its flat, or linear memory model, giving DOS. Windows and OS/2 programs as much memory as they need without breaking the memory into segments. OS/2 can handle memory objects from 1 byte to 4 gigabytes, giving you flexibility at both the small and large ends of the spectrum. OS/2 recognizes and uses all available memory. And you can set up DOS or Windows sessions individually with extended LIMA XMS 2.0, expanded LIM EMS 4.0 or DOS Protect Mode Interface (DPMI) memory.

THE | \$ /7 100



OS/2 DOES EVERYTHING

OS/2's ability to run Windows is only the beginning. The system also supports DOS equally well, and can run applications from all three environments at the same time—even on the same screen. So whatever PC software you need, OS/2 will bring it to the forefront.

DOS by adding the ability to truly multitask character-based, 16-bit applications. So installing OS/2 offers a clear advantage even if you continue to use the same DOS or Windows programs and postpone the use of 32-bit software

TIP: 0S/2 CAN FIX DISKS

If you actually want to repair your hard disk using CHKDSK, boot your system from a different disk. Use the Installation Diskette that came with OS/2 Insort it in drive A and restart the system. When the IBM logo appears, remove the Installation diskette and insert diskette 1. Press ENTER. When the first text screen appears, press ESC. This dumps you into the OS/2 command line. Insert diskette 2. Now, type "CHKDSK C: /F" to run CHKDSK from the floppy. (If C: isn't your hard disk, replace it with the correct letter in the command).

it were real RAM, limited only by the size of the hard drive. OS/2 silently and quickly swaps out to disk the memory that hasn't been used recently, freeing up real memory for actively processes. Because OS/2 manages memory in small + RB objects instead of variable 6+ RB elunks, memory fragmentation and swapping is reduced, and speed is increased. Rather than getting "Out Of Memory" errors, you get fast, efficient, virtual memory management that makes the best use of your commuter resources.

EVERYTHING STOPS. DON'T PANIC Occasionally, all activity in a window may come to a sudden halt. Don't reboot-vet. Instead, hit CTRL-ESC (for the Window List). Don't move the mouse or hit any other keys. Wait a minute. While the screen isn't doing anything, OS/2 is investigating what caused the application to freeze in the first place. In most cases, the Window List or an error message will non up. Or, the application will simply un-freeze after OS/2 has completed its diagnostics. At that point you may choose to close the application or keep working.

TIP: WHEN

THE HPFS MAKES
FILE AND DISK MANAGEMENT
MORE FLEXIBLE
The High-Performance File

Ine i right-retormance rue
System (IPPS) is OS/2's way of making
file management flexible. Its benefits are
numerous: longer file names, less disk
fragmentation, and access to traditional
DOS FAT (File Allocation Table) files.

HPFS files can have long names, up to 254 characters including spaces, commas, periods and other punctuation. That's a long way from the 8.3-character F4T maming convention. Vour "BDCT1992.DOC" now can be "Company-Wide 1992 Budget, Revision 1.0." The HPFS resists disk fragmentation, leading to higher performance: It's often five-to-ten times faster than F4T. The HPFS also recognizes and reads information created on disks using the F4T file system.

HPFS isn't for everybody, Ir is at its best on OS/2 systems with at least 6 MBs RAM and a 60 MB or larger hard disk. And if you increase the capabilities of your system, the IPFS will grow with it, supporting storage devices up to 512 gigabytes. The IPFS is an option when you initially install OS/2, or best you can add it later. If you have a larger disk, IPFS is a better choice for managing it.

CRASH PROTECTION* IS AN INEXPENSIVE INSURANCE POLICY

Crash Protection is OS-2/2 sway of keeping a single, misbehaved program from converting the entire environment into a gang of delinquents. With Grash Protection, you may have a misbehaved program, but one that's kept in solitary confinement. OS/2 protects system memory from your applications, as well as protecting the applications from each other.

By comparison, when a General Protection Fault (GPF) or a memory violation occurs under standalone Windows, your only recourse may be to reboot. Even if you can continue working by closing the offending program, there is a chance that the violation might come back to haunt you, Under OS/2, each window runs in its own virtual workspace (each workspace is a separate personal computer, as far as memory is concerned). If you get a GPF, only that workspace is affected. All other applications are protected and can continue undisturbed. So a single application failure won't hang the entire system.

27 CRASH PROTECTION WORKS ACROSS DIFFERENT ENVIRONMENTS

OS/2's ability to protect one application from the anomalies of another is a productivity breakthrough, but that's only half of the story. Any program running under OS/2-DOS. Windows or native 32-bit-shares this benefit. For instance, if you were running 32-bit DeScribe* 1-2-3 for DOS. and Corel Draw* simultaneonsly, a memory fault that occurs in any one of these applications won't influence the behavior of the others. Furthermore, vou can run different DOS applications in separate windows, and they will maintain the same isolated memory use and function (although it is possible to cut-and-paste information between the different programs).

In this case, OS/2 enhances standard

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FAT isn't exactly the FAT you're familiar with under DOS, Under OS/2, both FAT and the HPFS read ahead (for sequential I/O), "lazy write" to disk, and accept threshold parameters. The bottom line to these technical features is a faster FAT. So, even if you choose FAT, you've still got OS/2 power and speed working for you.

TIP: THE SKINNY ON HPFS AND FAT If you have no idea whether your OS/2 system is running from an HPFS (High-Performance File System) or FAT (File Allocation Table) partition, the CHKDSK command has the answer. Open up an OS/2 Full Screen or OS/2 Window session by clicking on the appropriate icon in the Command Prompts folder, inside the OS/2 System object, Type "CHKDSK" at the OS/2 command prompt. The first line will tell you whether you're running on a FAT or HPFS volume. You'll also find out how big the hard disk is, how much space is available, and so on, However, CHKDSK won't accurately report any errors, because it's running on the same disk it's checking.

300,000 PEOPLE TESTED OS/2 IN REAL-LIFE WORK ENVIRONMENTS

Prior to its release, OS/2 was tested at 30,000 sites by more than 300,000 users. This became the most comprehensive pre-release software test for any operating system or application in PC history, putting OS/2 through stress, usability and performance gamulets. Testing continues as every new release is readied. For example, IBM publicly amounced the availability of pre-release copies of new versions of US/2 on Compuserve. Copies were made available to customers who called a toll-free number until IBM distributed in excess of 10,000 betas in little more than a month, IBM answered beta questions on CompuServe, incorporating valuable customer input into the product.

VOU CAN AUTOMATICALLY
PROTECT THE CO2 SYSTEM
Afraid of leaving your computer screen open to prying
on security includes the Lockup feature.
Lockup is a combination screen
blanker, screen saver and password protection device.

To activate Lockup from the Workplace Shell, click the right mouse button and choose "Lockup now." Or determine in advance if you'd like Lockup to automatically start after the computer has been inactive for a set amount of time. Lockup will kick in by showing a bitmapped graphic of your choosing (the OS/2 logo and a serene lighthouse occan landscape are provided), then switch to a floating padlock. No unauthorized entry is permitted, and you can get back to your work by typing in your password.

OS/2 FEATURES A SUPERIOR INTERFACE

THE WORKPLACE SHELL PROVIDES A STRONG APPLICATIONS FOUNDATION After installing OS/2, the Workplace Sheff appears with a predetermined selection of tools and folders that will help to familiarize the OS/2

DECORATING THE DESK

The behavior of each OS/2 object is controlled through the Settings Notebook. This tab-driven module allows you to customize every aspect of the object, in a way that is clear and easy to understand

novice with the system's capabilities. For instance, the Drives object offers a fast path to file manipulation, and the Productivity Folder contains a selection of information management and time management tools.

But these are only the beginning. OS/2 has no menu bar, so you have a wide-open space on which to install the objects that you create and applications that you need. And the ability to place folders within folders—on a virtually infinite basis—let you sort and arrange objects exactly how you work. As a result, the Workpace Shell bas the ability to be as comprehensive or as simple as the situation remaires.

OS/2 menus also provide a context, offering only the commands that are available from that point in the interface. This gives you a clear idea of the choices available in each situation, and doesn't bog you down with irrelevant commands.

THE SETTINGS NOTEBOOK CONTROLS OS/2 OBJECTS
When you click on an OS/2 object and select the "Open Settings" menu sequence, you call up the Settings Notebook, Here, through selecting tabs that represent various categories, you select how this object will behave. The Settings Notebook allows you to easily fine-tune options such as associating files and modifying icons, as well as control window activity.

The Settlings Notebook is truly context sensitive; you are only given choices that will directly affect the specific object. For instance, the Lockup settlings let you determine the delay before the sercen saver begins, pick or add a bitmap image, tile or scale the bitmap image, and enter or change your password. The tab-driven interface makes the choices clear.



OS/2'S OBJECTS ECHO COMMON DESKTOP METAPHORS

Under OS/2, a Deskton object falls into one of four categories: File, OS/2 further develops the tra-

ditional file-as-data-recentacle metaphor, Files hold data and are tied to applica-Config.sys tions. So a "Memo" created in DeScribe sits on the Desktop, where clicking on the icon loads

the file and the application in one step. Program. This includes standard

application programs, utilities and tools. A program object, independent of a file, is positioned on the Desktop for easy access and in many

Window Washer

cases controls system functions. Device, A device qualifies as any peripheral that connects OS/2 with the outside world: A printer, FAX, modem, network or disk drive

all appear as Desktop objects. The Shredder-essen-Shredder tially the OS/2 delete

command—is also represented in the same way Activating a device object is simple

and straightforward: You highlight the file and drag it over the device to execute the command. Where appropriate, a dialog box appears to confirm the command.

Folder, The OS/2 folder acts like its analog counterpart, containing several disparate parts that all relate to the same subject. It may contain Games a combination of files, programs and devices, all pertaining to a single task or project. You can also install a folder within a folder (or an object within a folder)to build a hierarchical series of objects.

0S/2 TEMPLATES SET THE STAGE FOR CUSTOMIZED DATA ENTRY The OS/2 Templates folder.

installed with the Workplace Shell, allows you to instantly create objects and install them on the Desktop. Any item in the OS/2 Templates folder can be highlighted dragged to another location, and opened as a custom file, where it becomes the appropriate database, spreadsheet or document for data entry.

In addition, many OS/2 applications place a custom template into this folder during installation. For instance, to creare a memo you may highlight the De-Scribe Template and drag it to the Desktop or into a new folder. Then, Altsingle click on the title and modify it accordingly. It's much like a pad of paper, where you tear off one sheet at a time. Under OS/2, each sheet of "paper" harnesses all the full power of the operating system. So instead of a pad of paper you can have a pad of spreadsheets.

WORK-AREA FOLDERS KEEP YOU ORGANIZED Keeping track of information and programs related to a project is simplified with workarea folders. A work-area folder looks like any other folder object, but the biggest difference is that anything you keep in that folder is closed and saved whenever you close the folder, Aud, when you reopen the folder, everything in it is restored to the view in effect when you closed it, So, OS/2 works along with you.

Imagine a project which includes several reports, a spreadsheet, and a printer with custom settings. All can be kept in a work-area folder, always opening to the

view in effect when you last left the project. If you hide or minimize the folder, everything in it hides or minimizes at the same time. When you show the folder, everything reopens. One example of a work-area folder

GROUP YOUR FILES LOGICALLY BY PROJECT

With OS/2's Work-Area Folder option, you can easily group files and applications that pertain to a specific proiect by using the Settings Notebook.

Productivity - Settings Undo Help

is the OS/2 Deskton itself. The Deskton is actually a work-area folder which remembers object placement and open objects whenever you close the folder by shutting down.

Create a work-area folder by clicking the right mouse button on a folder. choosing Open, then Settings, and then the File tab, Just click "Work area" and the folder is now a workarea folder object.

THE WORKPLACE SHELL IS A GREAT **ORGANIZER** The Workplace Shell is more than a digital desktop from which you launch computer applications. The most significant difference between Workplace Shell, the touchstone of OS/2, and the controlling interfaces of other operating systems is that it is completely customizable. There are no fixed objects in the Workplace Shell, You can easily add or delete any system or program function and include as many or as few commands on the Desktop as you wish.

Furthermore, almost all aspects-fonts, colors and icon arrangement—are easily customizable, with a minimum of reference to documentation. In most cases, these changes only require a simple drag-and-drop command.

More significantly, the Workplace Shell is completely object oriented-each Desktop object offering a direct path to a file, program, device or folder. This brings a realworld metaphor to the computer Desktop, as every object on an office desk falls into one of these categories.

Everything within OS/2 has a frame of reference to the "real world." And like your own desk, access to the contents of the object is immediate. You don't need to issue commands to load a program or open a file in order to access the object's contents. (Similarly, you don't need to say things like "Alt-File-Open-Budget" to open a paper folder with a spreadsheet inside.)

TIP: THE ORGANIZATION DESKTOP

If you have a lot of windows open and need to get something from the Desktop, it takes time to hide or move all the windows. Make the Desktop accessible by making a copy of it in a window. Then, you can use the Windows List CURIL #SCI List sacks the conv

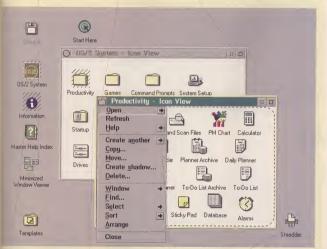
or move all the windows. Make the Desktop accessible by making a copy of it in a window. Then, you can use the Window List (CTRL-ESC) to select the copy and bring it to the top. First, click the right mouse button on the Desktop background, choose Open and Settings. In the Settings Notebook, choose the Window tab. In the "Object open behavior" area.

click "Create new window." Close the Settings Notehook

Now, open a copy of the Desktop in a window from the Desktop itself. Click the right mouse button on the Desktop background, and choose Open and any view you desire (Icon, Tree or Details). You can dismiss the new Desktop window at any time in the same way you'd close any window. Conveniently, you can arrange the Icons in the window into a view that's best for a particular task, and a copy of the Desktop can be in Details view within the normal Deskton inself reflects icon view.

The Minimized Window Viewer offers an icon view of all open applications. You can also get a task list with a simultaneous left/right mouse click anywhere on the Desktop. The upper left-hand corner of every window contains the program icon for the active application. This gives each 0S/2 window an individual nature and offers an immediate visual clue about the window.

Hide, Minimize and Maximize commands are part of every OS/2 window. A single click on the small square hides the application but keeps it active. A single click on the large rectangle toggles between full screen and windowed size.



The shading on a Workplace Shell object indicates that the application is currently active. A double-click motion accesses the open copy of the object directly.

OS/2 allows objects and folders to be nested within other folders. As you progress from one folder to another, each is automatically cascaded on the Workplace Shell surface. OS/2 menus provide all the choices available for a particular object, along with the context. Here, the menu commands control the area within the dotted line. When a device object is represented anywhere on the Desktop, you can drag-and-drop another object to execute a function. Dragging a file over the shredder object would delete that file.

08/2'S ABILITY TO LINK FILES AND APPLICATIONS BUILDS A DIRECT PATH RETWEEN THE USERS AND THEIR DATA

OS/2 makes it easy to connect data files with the appropriate application. You can create this link directly, or even make "shadow" copies, where icons in different places link to the same object, Either way, a single double-click will open both your file and the program you need to run it, ending frustrating minutes of trying to remember

which application created which bit of information.

OS/2 does this by creating an association between a program object and data-file objects. You can associate files to programs in three different ways. The first ties the type of file (e.g., a spreadsheet data object) to the program which created it (e.g., a spreadsheet application). Whenever you click on the file, it and the spreadsheet program

Help Сору... Move... Delete...

Original +

click calls a non-un

open at the same time. The second links a program object to data files by a part of the file name. For example, all files with the extensions DOC or TXT could launch the OS/2 Enhanced Editor. The third way associates a single file to a program name by listing the program as an option on the data file's Open menu.

Сору... A single right-mouse Delete...

menu, which offers the available options for a link to another file, application or folder.

A way to maintain access to an object from multiple areas without duplicating the object itself, is to use OS/2's shadows. And, when you manipulate information in a shadow, the information in any other shadows and the original is also changed.

TIP: ME AND MY SHADOW

Instead of using the object's menu to make a shadow, simply press Ctrl and Shift while you click and hold the right mouse button. Drag the object to any folder and release the mouse button. Voila! A shadow appears!

OS/2 HAS STYLE It's easy to personalize OS/2's interface to reflect your own taste and style. The primary tools to do so-tools controlling color and fonts-are in the System Setup folder within the OS/2 System group... just four mouse clicks away from the Workplace Shell's opening screen. Here, you give each window, folder and object its own color and font scheme and bring a new level of personality to the Desktop.

With the Color Palette, you select the desired hue with a single right-button click, at which point the cursor changes into a paint roller dripping with that shade. You drag the cursor to the destination-a window, menu or Desktop-and release. The color changes instantly. Similarly, to modify the font on any menu or window, you highlight a type style on the Font Palette and drag it to the target.

The Scheme Palette allows you to customize colors and fonts for individual windows or across the system in one action. The described Color Palette and Font Palette actions only affect the target windows, or you can hold the Alt key to make the modification work universally.

IN LIVING COLOR

Both the OS/2 Color Palette and Font Palette allow you to customize visual preferences. A drag-and-drop action changes these aspects in one program or across the system.

TIP: THE UNIVERSAL DRIVER

Thinking of changing mice and don't know what mouse driver to select? OS/2 intelligently detects and installs the correct mouse driver. So don't worry if you're not prompted during installation for your mouse type---0S/2 has sensed it and installed a driver which works

THE 0S/2 MOUSE OFFERS SHORTCUTS TO POWER While OS/2 provides sever-

shortcuts, the heart of user interaction with the system comes from that trusty denizen of the digits, the mouse, It is the mouse, in fact, that gives the user complete control over OS/2 commands, in a powerful, intuitive way. Nevertheless, using the OS/2 monse involves more than just point-and-click.

al convenient keyboard

In addition to drag-and-drop, the right mouse button brings up a context menu, allowing you the choices that are available from that point in the interface. Another universal OS/2 mouse command is the simultaneous left/right single click anywhere on the Desktop, which brings up the active Window List.

These options can be customized through the Mouse object in the System Setup group, Here, you adjust the mouse for left-handed or righthanded operation to suit your style, or remap different buttons to drag-anddrop, or call up the Window List, You also determine the combination used to change the Desktop title. (Alt-left button is the default.)



A Property of the property of

POP-UP MENUS GIVE USERS CLEAR CHOICES

Pop-up menus show exactly what you can do at any given time. Clicking the right mouse button anywhere on the Desktop opens a pop-up menu, which controls the most important Workplace Shell

functions. Besides the ability to arrange and sort all Desktop objects, this menu controls password lockup and shutdown. Like other OS/2 menus, this feature shows only

OS/2 menus, this feature shows on the choices that are available from that point in the interface.

You can add choices to the Workplace Shell simply by modifying the pop-up menu.



TIP: CHANGE THE CHOICES

OS/2 allows users to change the context and add choices to the menu. For instance, you may want to add file search capabilities, so you would do the following:

Open the Settings Notebook and select the Menu Page.

2) Click "create another" below the primary pop-up menus field. Type the menu item name, path and filename (in this case, C:\OS2\APPS\PMSEEK.EXE) of the desired application into the pop-up dialog box.

Close and exit. The program then appears on the bottom of the system menu.

These modifications are reflected only in the individual menu, so if you change the choices in the Drives window, it doesn't affect menus anywhere else on the Workplace Shell.

TIP: POWER TO THE KEYBOARD IT WAS WASTED AND THE SENDARD TO WHITE AND THE SENDARD THE SEND

repeatedly will go to every object

that begins with that letter. Then,

THE 0S/2 MOUSE
IS AN ARTFUL
DRAG-AND-DROP TOOL

hit ENTER to open the object.

OS/2 relies on the right mouse button to complete drag- and-drop commands, allowing you to control objects in an intuitive way. You highlighthat alie or an object with a single right-button click, then hold the button down and pull it to the desired location: Inside another folder, to a device or onto the Desktop, Releasing the button executes the function.

Drag-and-drop isn't restricted to a single item. If you highlight a file or object with the left mouse button and drag it across another file or object, this highlights both items and allows you to execute a single function like print or shred.

Mouse/key combinations also help to execute the drag-and-drop functions. Ctrl-right mouse button makes a copy of any file or object, which can be moved to any folder.

THE UNITAPPING THE MOUSE if your mouse disconnected or died sometime during an 60% session, don't panic. Press CTRL-ESC to bring up the Window List. Use the arrow keys or type "0" to select the 05/2 Desktop, and press ENTER. Hold down CTRL and the \ key to de-select any selected icons. Finally, Press SHIFT-I to b bring up the Desktop menu, and use the arrow keys or type "0" to shut down.

THE OS/2 SHUT DOWN COMMAND PROVIDES A VIRTUAL BOOKMARK

Many users, when they are finished with their work, are inclined to just save the current files and turn off the computer, Under OS/2, it's better to use the Shut Down command (part of the Desktop Menu, accessed through a right-button mouse click on the Desktop) to save all open objects, folders and programs, Following this, it offers the option to save or abandon changes in a DOS or Windows session. At the next startup, everything goes back to where you were. This extends the comparison to a standard desk: When you come to the office in the morning, your desk looks the same as the night before.

Some of today's computing envi-



THE

ronments require around-the-clock operation, so you may only use Shut Down if you want to move the system. add expansion cards or turn the computer off. Turning off the power in the middle of an OS/2 session may damage the PC's initialization files and corrupt the Desktop, even if all of the

TIP: CLEAN YOUR DESK To start with a clean Desktop at startup. hold down the left CTRL, left SHIFT and F1 keys simultaneously from the moment the mouse pointer appears until icons are displayed on the Deskton. This

will disable automatic restart for

the current session only.

up folder.

Another method is to add a line to the CONFIG.SYS file. Use the System Editor or Enhanced Editor (in the Productivity folder under the OS/2 System object) to open CONFIG.SYS. Add the line: SET RESTARTORIECTS-STARTUPEOLDERSONLY. Save the file and reboot. It'll keep disabling the automatic reloading of open apnlications, excent those in the Start-

OS/2 COMES EQUIPPED WITH EVERYTHING YOU NEED TO GET STARTED

OS/2 ARRIVES WITH A HAND-**FUL OF ESSENTIAL UTILITIES** Right out of the box, OS/2 provides well-thought-out adjuncts to a fully functional operating system. With the included "applets," IBM is priming the pump with a range of utility programs, which demonstrate the 32-bit environment in graphics, communication, system and time management areas.

Included as part of the Productivity Folder in the OS/2 System group. OS/2's applets help to acquaint you with the OS/2 interface and menu structure as you complete these tasks. For instance, you can change the font size and the color of any of the OS/2 applets, or control the menu typefaces with the font palette.

TIP: YOU CAN CUSTOMIZE THE LOOK OF ANY OS/2 APPLET Every OS/2 applet has a Customize menu item, which lets you to select the colors of program components and the font size: From a tiny 10 x 6 to a commanding 10 x 22.

OS/2 INCLUDES A SPREAD. SHEET AND A DATABASE Ten years ago, the spreadsheet and database included in OS/2 would have been sold as standalone applications. The 26 column x 40 row spreadsheet allows you to track monthly expenditures, sales figures or any other numerical data. You can also write and execute simple formulas.

The OS/2 Database allows you to create up to eight fields and is ideal for the maintenance of phone lists or simple data projects. Each database can contain up to 5,000 records and includes a built-in telephone dialer (accessed with the Ctrl-D command).

OS/2 HAS TWO RUILT-IN TEXT EDITORS OS/2 includes two text editors, one for editing and creating text files and another for programming and light word processing. The System Editor can create and edit CONFIG.SYS and AUTOEXEC.BAT files. It's also a convenient tool to display other text files or perform basic editing tasks. You can start several

text files up to 32 KBs in size. The Enhanced Editor takes text editing several steps further. You can work on multiple files at the same time. It runs from a menu or command line. Text is drag-and-droppable under Presentation Manager? You can record and playback keystrokes. choose the font and font attributes. automatically save files after a number of keystrokes, and use it as a Presentation Manager platform for running REXX programs (see #59).

versions of the System Editor so you

can edit several files in separate win-

dows. System Editor easily handles

E:\README.TXT File Edit Search Options Command Help

P 9 0

EGA, VGA, Hercules graphics card or compatible video graphics adapter and monitor

- An IBM Compatible PC (80386 microprocessor or higher)

- 1 Megabyte of RAM (2MB or more is recommended for improved performan - One 1,2MB 5,25" diskette drive or 1,44MB 3,5" diskette drive
- A Hard Drive with at least 2.5MB of free disk space after Windows has been installed

A printer compatible with Windows 3.0 or higher

Line 77 of 110 Column

1 File

Modified

OS/2 HAS TEXT APPEAL

The OS/2 system includes two text editors. The System Editor (top) handles files of up to 32 KB, and is used for editing system and .BAT files. The

Enhanced Editor (bottom), with font support and drag-and-drop text, can be used for light word processing chores.

E.EXE d:\config.sys IFS=D:\OS2\HPFS.IFS /CACHE:64 /CRECL:4 /AUTOCHECK:F PROTSHELL=D:\OS2\PMSHELL.EX SET USER_INI=D:\OS2\OS2.INI SET SYSTEM INI=D:\OS2\OS2SYS.INI

SET OS2 SHELL=D:\OS2\CMD.EXE SET AUTOSTART=PROGRAMS, TASKLIST, FOLDERS SET RUNWORKPLACE=D:\OS2\PMSHELL.EXE SET COMSPEC=D:\OS2\CMD.EXE

LIBPATH=.:E:\MYDLL:D:\MUGLIB\DLL:E:\IBMLAN\NETLIB:D:\OS2\DLL :D:\OS2\MDOS;D:\;D:\OS2\APPS\DLL;D:\ibmcom\dll;O:\IBMC\DLL;O:\ TOOLKT20/DLT-E-/ ODERSHILL

Insert

GET PATH-E:\EOS2;E:\UTIL;E:\SD386;E:\IBHLAN\NETPROG;D:\MUGLIB;D: \OS2;D:\OS2\SYSTEM;D:\OS2\MDOS\WINOS2;D:\OS2\INSTALL;D:\;D:\ OS2\MDOS;D:\OS2\APPS;D:\IBHC\BIN;D:\TOOLKT20\OS2BIN; DPATH=E:\IBMLAN\NETPROG;E:\IBMLAN;D:\MUGLIB;D:\OS2;D:\OS2\S YSTEM;D:\OS2\MDOS\WINOS2;D:\OS2\IRSTALL;D:\;D:\OS2\BITMAP;D



TALKING BACK

OS/2's PM Terminal is a good introduction to 32-bit telecommunications It comes are-configured with protocols and numbers for the most nonular online services, and allows you to unload or download large files in the background while

A CHARTING PROGRAM TAPS THE GRAPHICS POTENTIAL

PM Chart has a variety of drawing and charting tools to ease the creation of business graphics. And it comes free with OS/2

PM Chart has a worksheet for entering data you want to chart. Charts (and other functions) are chosen from icons on a tool bar. You can present your data in a variety of chart types including area, bar, column, line, pie, exploded pie and table, with options for legends and 3D perspective. For

A TERMINAL PROGRAM CONNECTS YOU TO AN OUTSIDE 32-BIT WORLD PM Terminal is OS/2's

built-in way of getting you booked up to online information services and other personal computers with your PC's modent.

PM Terminal, in technical terms, handles asynchronous communications and terminal emulation using the OS/2 Workplace Shell. This lets you communicate with other computer systems and transfer information. When you launch PM Terminal, you'll find it comes configured with a variety of profiles for CompnServe, GEnie, IBM's own OS/2 bulletin board system. and other services. These profiles are easily changed. or you can add your own (perhaps to hook up with a local computer bulletin hoard system or a friend's personal computer). PM Terminal also lets you record

TIP: ICON BE CREATIVE. While running a DOS graphics program in a window, use the graphics cut-and-paste feature to clip a picture and paste it into the Icon Editor. You can then quickly and easily create customized icons for all of your applications.

frequently used keystrokes as

macros.

BUILT-IN DISK CACHING SPEEDS ROUTINE OPERATIONS

Routine disk read and write operations take time and decrease responsiveness. OS/2 deals with this by including disk caching as a standard feature. As disk operations typically are the slowest aspect of computing, executing as many functions as possible in memory will speed overall operations. Furthermore, a cache reduces wear and tear on your disk because the CPU is

not going to disk as often

OS/2 automatically selects the size of the disk cache when you install the operating system, based on your installed memory, disk size and file system (the default for a system with 4 MBs RAM is 128 KBs). However, you can adjust the size of the disk cache after installation by using the DISKCACHE command in the CONFIG SVS file

OS/2'S STICKY PAD HELPS TO MANAGE RANDOM INFORMATION One of the most popular and useful DOS utilities was the Sticky Pad, a way to

capture the random information that makes every business day confusing. OS/2's embedded Sticky Pad, located in the Productivity Folder, has none of the irregularities of the DOS-based memory resident programs. Instead, it looks just like the pad you put on your refrigerator. You can write a new note and "tear" it off (through a drag-and-drop motion) and place it on the Desktop.

With the Sticky Pad, you can enter any information-text or numeric-before deciding to which application it belongs. After that time, you highlight the text and copy to the clipboard, and then paste it into the appropriate application. Or you can minimize individual notes on the Desktop, where they are indicated as small numbers across the bottom of the screen.

drawing, PM Chart can import and manipulate clip art, create arcs, rectangles, ovals, lines and freehand objects, and align objects. In addition, charts and drawings can be annotated with text, printed and copied to OS/2's clipboard.

OS/2'S TUNE EDITOR IS AN INSTRUMENTAL UTILITY The OS/2 Tune Editor allows you to create and edit tunes to be used with the Alarm utility. You can write, edit and play up to 36 individual tunes of up to 20 notes each. Four sliding bars adjust for value, note, tempo and pitch, and you can work on either the bass or treble clef (although the Tune Editor can play only one note at a time). And you can tie these sounds to any Aların reminder to keep you on schedule.

The possibilities are virtually endless: You can open each computing day with "Reveille," and close with "The Minute Waltz"... or be considerably more imaginative and create your own compositions.

THE IS

TIP: A 32-BIT REMINDER

Need a reminder to back up your hard disk? How about launching the backup program automatically? OS/2's built-in Alarms application is just the tool. Choose "Set Alarm." In the Comment line, type the name of the .EXE or .COM file you want to launch (with the complete path, if it's not in the same subdirectory as Alarms). Choose the day, hour. minute and other settings, making sure you check the "Execute comment as command at Alarm time" hov Click on the Set button Close the Set Alarm window, and hide (don't close) the Alarms application. (If you close it, the Alarms don't function). When the appointed hour arrives, your application will launch.

A BUILT-IN SEARCH CAPABILITY HELPS FIND LOST FILES

With the average hard disk exceeding 100 MBs, it becomes impossible for users to remember what information is in which file. Therefore, one of the most popular and useful add-in utilities in the DOS environment is Text Search, where users can instantly comb a disk for a certain phrase or data string. Under OS/2, Text Search is a system-level utility (Seek and Scan Files, in the Productivity Folder of the OS/2 System group), that is fast, thorough, and, best of all, included at no extra cost.

The program is simple and straightforward: You type in the files to search, such as *.DOC, a text or numerical string of any length, and the drives to

search. After a few seconds, the files that contain that string will appear in the "Files found" window. You can then open the file by dragging the file name and dropping it upon the Enhanced Editor icon (as long

as the Enhanced

Editor is loaded).

MATCHLESS BATCHES

functions.

Users with a minimum of programming knowledge can streamline their computing routines with OS/2's REXX procedure. This produces powerful batch files to execute complicated, automated

AND GAMES ARE INCLUDED

One of the most popular Microsoft Windows applications is the Solitaire game that is included with the system. OS/2's version. Klondike Solitaire, leads the pack of the included games. This includes two puzzle games, a graphical chess game and Reversi, the popular strategy game that is no longer available under Windows.

OS/2 games provide a way for you to have fun with the system, practice your "drag-and-drop" technique, and take a break from the routine. In between spreadsheet recales, for instance, you may want to fit in a round of chess against the computer. Or you can squeeze in a few games of Solitaire during a download.

TIP: PLAY CAT AND MOUSE WITH THE CURSOR

If you have trouble seeing the mouse pointer while using a gray-scale or monochrome monitor built into a laptop PC, there's a remedy. The most visible-and fun-is to go into the Games folder (in the OS/2 System object). Double-click on the Cat and Mouse object. Now, hide the Cat and Mouse program by clicking on the appropriate box, so Cat and Mouse keens running while you're working.

An animated cat will chase your mouse pointer across the Desktop, comnensating for the invisibility of the cursor caused by rapidly moving the

mouse. (The cat will even follow the mouse pointer behind open windows.) (Cat and Mouse is actually designed as a tool to teach you to use the mouse. It's easy to disable when you get tired of it. Just click CTRL-ESC to bring up the Window List, and click on Cat and Mouse. Either close the window by double-clicking in the upper left hand cor-

ner, or, under the Actions menu, choose "Disable cat.")

OS/2 HAS A POWERFUL SYSTEM-WIDE PROCEDURES LANGUAGE If you've ever written DOS

batch files to automate functions, you know how convenient they can be. But they can also be frustratingly limiting. OS/2 breaks through batch file limits with its REstructured eXtended eXecutor (REXX), a powerful procedures language, REXX got its start on mainframes, and all of its power is now

part of OS/2. And it's accessible power. REXX lets you produce what you might think of as a super-batch file. However, it uses common English words and a natural syntax flow which both beginning and experienced programmers can understand. Existing batch files can be converted to REXX procedures, adding power and function, REXX instructions don't need to be compiled: Just create a command (.CMD) file, and you're done.

OS/2 Procedures Language 2/REXX Services Options Help Making Decisions(IF THEN) The IF instruction is used with a THEN instruction to make a decision. The interpreter runs the instruction if the expression is true; for example: IF answer = "YES" SAY "OK!" In the previous example, the SAY instruction is run only if answer has the value of YES.

Previous Search... Print. Index Contents Back

TIP: THE FIND COMMAND HELPS YOU PREPARE

The Find function, on the main menu of the Workplace Shell, takes text search to the next logical step. You type the text that you need, such as "Budget," and direct the program to search all folders. It then creates a new folder that contains all the file objects that contains all the file objects that contains so see all the budget file, they are but a few keystrokes away.

JUST YOUR TYPE

Adobe Type Manager, the font technology favored by design professionals, is part of the OS/2 system. Combined with OS/2's convenient drag-anddrop fonts, ATM adds real type flexibility.



OS/2 IS A SUPERIOR APPLICATIONS PLATFORM

OS/2 IS A NATURAL ENVIRONMENT FOR PORTABLE COMPUTING Multilasking is a necessary

feature on the desktop, but it can be absolutely essential on the road. The major multitasked functions for OS/2 compating will be printing and communication, used in conjunction with your primary application. On the road, when both time and battery life are at a premium, you don't want to spend many minutes staring helplessly at the screen while the computer sends and receives a large file. So with OS/2, you can be downloading one message as

you respond to another.

OS/2's ability to multitask communications and other applications makes it a natural for portable computing, especially since most of today's new note-book computers have the power to run the system at peak efficiency. As OS/2 evolves, IBM will continue to add exciting capabilities that will enhance portable computing.

622 PROCESSES
WORDS WITH FLAIR
Pundits once thought
that word processing,
of all the major applications,
would benefit least from 32-bit
power. Not True, A capable 32-bit

word processor. De-Scribe, is already on the market and market leaders WordPerfect*. Computer Associates and Lotus* intend to enter the category in 1993. Some of the advantages are obvious. like the ability to print one document while continuing to work on another. Others are more subtle: DeScribe interacts with the Workplace Shell, and allows you to drag a document icon onto the INSERT icon to enter that document's contents into an open De-Scribe file.

This process allows corporations to create OS/2 INCLUDES ATM, FOR STATE-OF-THE-ART TYPE MANAGEMENT OS/2 is also the only PC operating system

Type Manager* (ATM) as part of the system software, without requiring the user to buy or install another type package.

ATM (included there for both Windows and OS2) is the font management technology that a been adopted as the standard by designers for sharp on-screen type rendering. This makes it easier to kern type and change leading. ATM also speeds printing of heavily formatted decuments.

lengthy "boilerplate" documents, invoices, statements, etc., and easily insert them in whatever order fits the situation.

OS/2 PUTS MORE
PUNCH INTO GRAPHICS
Better performance, more
color and greater productivity turn OS/2 into the best environment for creating graphical output.

The coming ÓSC 23-bit graphies engine will be enabled to support up to 16 million colors, so designers and illustrators are no longer limited by computer color technology. OSC2 will refrave a large file or save it to disk as much as 25% to 30% faster. Even manipulations of complex images occur more quickly, and the OSC2 multithreading capability means that users can print large graphies files in the background while working on another image in the foreground. OSC2 transparently manages the complexity so users can be more productive.

WITH 0S/2 SPREADSHEETS, COMPLEX CALCULATIONS DON'T STOP EVERYTHING

A spreadsheet may seem mundane, but it only takes the OS/2 multithreading capability to make it more interesting. For example, Lotus Development Corporation's 1-2-3 for OS/2 uses multiple threads to make resource-intensive procedures run in the background. 1-2-3's Solver utility is used to perform complex optimizations that may involve many variables and may take as long as ten minutes to run. With the DOS versions of 1-2-3, the user must stop working in the spreadsheet while Solver performs a task. But with the OS/2 version of 1-2-3. Lotus has given the Solver its own thread. This means that a Solver process can run in the background while the user continues working with 1-2-3. And printing runs as a separate thread, so it

won't slow you down.

OS/2 DATABASES CAN SPEED OPERATIONS BY HALF

As personal computers become more powerful database management systems are required to manage larger, more complex databases. But no matter how powerful the hardware, database performance is ultimately determined by the underlying operating system. Getting 32-bit performance out of a DOS database, for example, requires extender technology and extenders impose a significant performance penalty. Because OS/2 is a 32-bit, multitasking operating system. OS/2 database management systems can provide extremely fast processing of large databases.

Suppose, for example, a user needs to perform a join on two tables, each of which holds several rows. With a DOS database, data in each table would need to be read sequentially before the results could be returned. With a multithreaded OS/2 database, concurrent threads could read each table simultaneously. before combining them into the join and returning the results. This capability reduces the time required for the join by as much as 50%.

OS/2 IS A LIVELY SHAREWARE PLATFORM The shareware market. which allows users to "try before you buy," has a large, rapidly growing set of useful, engaging and fun-OS/2 programs-all available for download from bulletin boards worldwide. Logging onto a BBS, in fact, may be the best source for interesting icons, bitmaps, screen savers and games under OS/2. And under OS/2, you can contin-

In addition, you can also find business-based utilities and system accessories in shareware outlets. For instance JP Software's +OS2 is an alternate command processor that strengthens the OS/2 command line. (The company also makes the popular 4DOS,)

ue to work during the download.

TIP: EXPLORE THE WORLD OF 05/2 If you want to log on to an OS/2 related BBS, find a file with OS2WORLD in the title, for example OS2WOR.ZIP on CompuServe, You'll get a list of OS/2 BBS's worldwide.

OS/2 IS A SUPERIOR NETWORKING PLATFORM

EXTENDED SERVICES EXTENDS YOUR COMPUTING POWER To supplement OS/2 on a standalone PC. IBM offers the Extended Services package. This expands the power of OS/2 over your local area network (LAN) with two powerful software packages: IBM's Communications Manager (an SNA gateway) and IBM's Database Manager (which can also be used as a standalone system), Extended Services gives you the power to access remote files, communicate with outside information services, and record transactions—all at the same time. Use

different connectivity, communications protocol, operating system and hardware requirements. Ultimately, OS/2 Extended Services makes it easy to link your PC to needed information.

it to support peer-to-peer networking

cations across environments that have

operations and distribute computer pro-

cessing demands. Even work with appli-

COMMUNICATIONS MANAGER HELPS TO MAKE THE CONNECTION Getting information from

one PC to another computer in an office-or around the world-can be a daunting task. Communications Manager provides a "no barriers" approach to accessing this data on compatible mainframes, minicomputers and personal computers.

Communications Manager links you to a variety of IBM and non-IBM applications running on host computers. It does this by emulating ASCIL IBM 3270 and IBM 5250 terminals. Since OS/2 is a multitasking operating system, you can simultaneously transfer files to and from several different hosts. The peer-to-peer communications canabilitics let different OS/2 workstations on a network share resources and tasks. Support of the Network Device Interface Specification allows you to pick the best network interface card for your hardware from a variety of manufacturers. It also allows you to connect to multiple hosts off a single card.

DATABASE MANAGER MAKES INFORMATION COUNT Database Manager adds

staudalone database functionality to your OS/2 workstation. It is a relational database with SOL (Structured Query Lauguage) compatibility. letting it speak the language of IBM host data management systems like SOL/Data Systems and DATABASE2 (DB2). Issue SOL statements, commands and utilities directly from the OS/2 command line. Or it can use a friendly graphical interface for querying, reporting, data entry and editing, and creating tables. Even DOS and Windows applications can get information from OS/2 Database Manager databases, with no need to learn SOL syntax to access, undate and administer data.

If you want to put network database information in a central location, look to the optional OS/2 Extended Services with Database Server. Database Server acts as an information host for the Database Manager clients on your network. It provides OS/2, DOS and Windows client applications access to remote OS/2 database servers, making it seem as though the data hosts were managing the information right at your desk. Plus, it has all the features of the regular Extended Ser-

vices package.

BS/2 STREAMLINES HOST ACCESS lu the complex computjug environments found in large, multinational

hosts. OS/2 was designed to simplify and stabilize the process of sharing data among diverse computing systems.

Because PC-to-host communications are frequently incorporated into important business applications, a protected system is vital, OS/2 provides a stable communications environment protecting the PC-to-host connection from the failure of other applications.

TIP: 0S/2 SPEAKS

THE LANGUAGE OF

OS/2-based communica-

THE "HOST"

tions programs can automate many

host activities. For example, some

matically print Office Vision/VM

Vision/VM mail arrives. Because

OS/2 is part of the overall IBM cor-

communications products can sim-

porate computing architecture, OS/2

when a new piece of Office

OS/2 products make it easy to auto-

(PROFS) messages. These products

can also automatically notify users



BE MY HOST

OS/2 allows you to use one PC and one Token-Ring card to connect to multiple hosts. Outside View (Crystal Point Inc., Bothell, WA) emulates five different terminal protocols and supports multiple sessions and simultaneous file transfers. In this illustration, a PC is conmeted to two hosts

OS/2 OFFERS PROTECTION THROUGH THE SERVER CONNECTION

Because OS/2 is designedfrom the kernel up to support clientserver computing, corporations are finding it easier than ever to quickly and efficiently deliver data to users anywhere in the PC enterprise. And with OS/2, it doesn't matter where the data resides, what kind of system it is using, or what kind of network is used to gain access.

There are good reasons why OS/2 has been chosen as the basis for many of the most powerful networking systems in place today. First, OS/2 provides a protected-mode, multitasking environment on a PC server. With traditional, unprotected network operating systems, if any server application attempts to use memory inappropriately, there is a good chance that all applications running on that server may crash—bringing the entire system to a balt.

Superior protection then becomes a major OS/2 advantage. If a company is expecting to rely upon its servers, it cannot sustain its business for very long if its servers are vulnerable.

ply and easily connect to the existing host-based network. OS/2 GIVES NEW POWER TO VERTICAL

APPLICATIONS
Vertical applications, programs that meet the specialized needs of a particular industry, have found a home on OS/2. All of OS/2's advantages—multitasking, multithreading and memory protection—have magnified importance when an application does not have the user base or breadth of support of a standard business program.

port of a statistard bisiness program. Many vertical applications require the constant updating of data across both local-area and wide-area net-works, with one or more network servers forming the hub for these transactions. OS/2 was designed specifically for this, It supports both database-oriented client-server computing and easy connectivity with host computers and other LANs. And the easy upgrade path lets all users have the latest software.

MULTIMEADURE ADDS.
VALUE TO HOST ACCESS
Because OS/2 employs multiple
treads, OS/2 communications programs can efficiently access several hosts at the
same time. For example, a user
can download large files via highspeed modern in the background,
while working within an E-Mail
program in the foreground.

OS/2 simplifies communications by providing the richest set of communications APIs of any system, with APIs for TCP/IP, X,25, asynchronous and other access methods, OS/2 also provides a cobesive communications environment by supporting common networking topologies, including Ethernet's and Token-Rime.

05/2 PROVIDES COMMUNI-CATIONS CONTINUITY This rich group of features is

used in Software Corporation of America's TalkTrur WR/9270 Server, TalkTrur uses the OS/2 X_25 API to pall in data from remote devices, It then uses the OS/2 Logical Unit Application API to hand off the incoming request to an SNA network and await a response. This provides 32°T0 commurications capability on a single-station basis (LU to LU), eliminating the need for remote cluster controllers. (These advanced features are part of OS/2 's Communications Manager)

With OS/2, corporations can communicate across their computing environment, with security and stability. OS/2 OFFERS
EFFICIENT USE OF NETWORK
RESOURCES

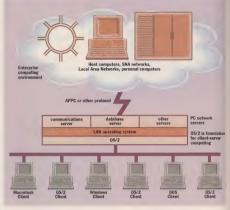
oS/2 also provides multiple threads of operation on the network server, so large numbers of workstations on the network can access the server. Because each cliem PC gets its own thread, the server can keep requests for data equal and in parallel. This translates into efficient use of processor memory.

OS/2 enables software vendors to build products that shield corporate developers from low-level programming chores. For example, Lotus Notes* for OS/2 takes advantage of OS/2's Named Pipes technology to provide remote interprocess communications (IPC) within a client-server application. However, a corporate developer creating an SOL Server application works with a higher-level network communications applications programming interface (API) -within SOL Server-and never needs to work directly with the Named Pipes protocol.

THE 18/2100

OS/2 PROVIDES FOUNDATION FOR ENTERPRISE COMPUTING

0.52 was designed to support the exchange of data throughout an enterprise. By choosing 0.5/2 as the foundation for a network operating system, corporations can support client computers running diverse operating systems while ensuring access to the entire corporate computing structure. Powerful network server products like IBM Database Manager and Lotus Notes make client-server computing a way to speed delivery of information at reduced coast.



OS/2 CONNECTS YOU
TO DATA ANYWHERE
ON THE NETWORK

OS/2 not only brings high performance and bullet-proof protection to the client-server network, the operating system also provides a platform for finding and sharing data from wherever it may reside in the corporation. Will BME Extended Services version 1.0, desktop PCs communicate with any computer that supports Advanced Program-to-Program Communications (APPC). This means that any OS/2 enabled computer talks to any system that supports this universal protocol

And when IBA's Extended Services are added to a computer runing OS/2, that computer may access data from any system on the network running APPC—from PCs, Macintoshes't UNIX workstations, AS/400s, and many other types of minis and mainframes. This turns a network running wide area network running wide area network protocols into a framework for "extended" client-server computing. OS/2 Extended Services makes this more than simply a pipeline to a host system and provides access to virtually any computer on the network.

When Advanced Peer-to-Peer Networking (APPN) is added to the communications mix, application installation, configuration, and network management become easier. OS/2 is now the only desktop operating system that supports APPN, giving it the ability to go virtually anywhere.

TIP: WHERE TO FIND **OUT MORE ABOUT APPC** To access the APPC Info Exchange Forum on CompuServe, type GO APPC at the ! prompt. IBM has created the APPC Market Enablement Group especially to inform software vendors and application developers. This group publishes a newsletter on APPC, APPN and CPI-C, along with a directory on APPC training and products. The group also holds conferences for developers and vendors and provides hands-on training courses. The APPC Market Enablement Group can be reached at (919) 254-4957 or via Internet to appcmrkt@vnet.ibm.com.

OS/2 MAKES THE NETWORK ADAPT TO YOU, RATHER THAN THE OTHER WAY AROUND

Finally, we have transparent networking, OS/2 gives you an easy way to customize your networking environment via the Workplace Shell. Because the Workplace Shell is object-oriented, it graphically represents a network operating system, such as IBM LAN Server. So you are treated, for example, to a graphical display of all the available services on the network through OS/2's resident Desktop. A remote device will ampear to be local.

OS/2's rich set of networking capabilities provide the user with extension that contained network resources for maximum productivity, and a development platform where rich business applications can be created. Selected servers are grouped into "domains."
Then, when you select a server, it displays the associated resources. You can then assign resources a "local identifier" (a local drive designation). After following this simple, object-oriented procedure once, the selected resources appear as local resources.

TIP: GOING PLACES IN THE WORKPLACE SHELL You can use the OS/2 Workplace Shell to include remote objects and resources in your local machine Desktop configuration. With the Workplace Shell Network Object. you navigate to remote objects by pointing and clicking with your mouse. The Network Object is a folder in the Workplace Shell: the obiects within the folder are server objects. After selecting a server, use standard Workplace Shell procedures to include remote objects in your Desktop configuration. For example, by holding down the Ctrl key and the right mouse button on a remote object, you drag a "shadow" of that object onto your Desktop, Once a remote object is in your Deskton configuration, you work with it just as easily as with local objects.

OS/2 PROVIDES A PLATFORM FOR DESKTOP APPLICATION DEVELOPMENT

OS/2 provides application developers with a protected, productive environment for developing DOS Windows or OS/2 applications, Within a single OS/2 system, a developer can concurrently design, edit, compile, test and debug for three popular operating systems, as well as those for mini and mainframe systems.

OS/2 gives developers the ability to run multiple processes simultaneously. Given the complexity involved in the programming of elaborate applications, this provides a major productivity gain.

For example, a developer may compile a program in the background while testing another program in the foreground. If and when the foreground process fails, the compilation will continue unaffected. As a result. the development process progresses much more quickly and smoothly.

The object-oriented approach employed by SOM gives developers a significant advantage over older procedural programming techniques. SOM is not a programming language, but a system for defining, manipulating and releasing object-oriented class libraries. SOM consists of a runtime library and a set of utility programs that support building. externalizing and manipulating software objects. SOM is used to define classes. and methods, while allowing developers to use the language of their choice for implementing these methods. (The current release of SOM supports the C language.) Most programmers will be able to use SOM muckly, without having to learn a new language syntax.

OS/2 TOOLS ARE A COM-PLETE 32-BIT DESIGN SET IBM provides a robust set of tools to speed the development of OS/2 32-bit applications. There are four core development tools: The IBM C Set/2 C compiler, the OS/2 Developer's Toolkit, the WorkFrame/2 development environment, and the OS/2 Technical Library, Qualified developers can also receive the OS/2 Professional Developer's Kit. These tools combine to provide professional developers with a complete solution for designing and implementing sophisticated 32-bit

WINDOWS APPLICATIONS ARE EASILY TRANSLATED INTO OS/2

OS/2 applications.

With Micrografx Mirrors* Windows applications can be quickly and readily ported to OS/2. Mirrors gives software vendors more opportunities to market their

products, and it gives corporate developers a better way to meet user needs or for large corporations to develop in-house applications that don't require massive retraining. A ported application,

while still 16-bit, has performance advantages, OS/2 manages memory more intelligently than Windows, resulting in better performance. In addition the OS/2

OS/2 IS A SUPERIO

OS/2 PROVIDES A POWERFUL PLATFORM FOR SERVER-BASED APPLICATIONS OS/2 gives applications de-

velopers a powerful platform for developing complex applications. With features like protected-mode memory, a full 32-bit flat memory model, and multiple threads, developers can write robust 32-bit business applications. For example, a customer database applica-

tion developed in Lotus Notes may reside on a server in Chicago. Notes uses the multiple thread capabilities of OS/2 to automatically replicate the customer datahase to other network servers located in other cities. In effect, the servers are dynamically calling one another to replicate and update the database. Remote users are able to call into the nearest database and have the server copy the customer database onto their PC. And only the changed records

OBJECT ORIENTATION STREAMLINES DEVELOPMENT OS/2 includes a language-

neutral, object-oriented programming mechanism called the System Object Model (SOM). SOM is specifically designed to support a new, object-oriented structure, and to be usable with both procedural (non-object-oriented) languages and object-oriented languages. IBM developed the Workplace Shell by using the set of objects and classes included in SOM, and these are available to all OS/2 programmers to speed the development process.

> **0S/2 HAS BECOME A PREFERRED** PLATFORM FOR DEVELOPERS

Developers like writing applications under OS/2. Its innate advantages give them room to create software that goes beyond the monotasking, memory-limited programs that have become commonplace in the PC market. Instead of attempting to shoehorn capabilities into a tiny box.

OS/2 gives developers a wider playing field to follow their imagination with fewer restrictions.

The OS/2 development process is not only more powerful, it is simpler. Programming commands are executed in a more direct, explicit way. In the long run, the streamlined development process results in more efficient programs, happicr programmers and delighted end users.

are updated. PC/COMPUTING

THE (\$ 2 100

32-bit graphics engine provides much higher performance than the older 16bit engine. The result is the best of both worlds. Mirrors makes every effort to retain identical operation between the original and ported versions, without secrificing the OS/2 look and feel.

SUPPORTS 0S/2 DEVELOPERS The IBM Worldwide Developer Assis-(DAP) supports any developer, anywhere, in the development of OS/2 applications. Commercial software developers can extend their membership in DAP with the Commercial Services program. This program includes additional online technical support, complimentary subscriptions to OS/2 Developer magazine, and discounts on IBM products, along with marketing assistance for commercial products. Vendors whose applications exploit the 32-bit capabilities of OS/2 receive all these services. plus a personal advocate within IBM who provides assistance and support and direct E-Mail access to the IBM Boca Raton Programming

IBM provides corporate developers with OS/2 development assistance through the IBM Technical Coordinator Program. This program supports corporate technical coordinators through the IBMLink electronic support library. The program also includes a monthly newsletter, the Personal Systems Technical Solutions magazine, satellite television updates, and conferences on technical support.

For more information on the IBM worldwide Developer Assistance Program, call (407) 982-6498 or FAX (407) 484-3233. In Canada, call (416) 946-3736. For information on the IBM Technical Coordinator Program, call (300) 547-1283. To enroll in the OS/2 Developer Assistance Program, type CO OS2DAP at the ComputServe command prompt.

OS/2 HAS A GREAT FUTURE

WHAT'S NEXT FOR 05/22 Since its release last spring. OS/2 has gained the compater industry. Also since that time, IBM has worked to further reline the system. It is bringing the most talcuted systems designers and developers in the world to Boca Raton to join the development team, to develop future versions.

This year, OS/2 will be pre-installed on a growing number of hardware systems from many PC vendors world-wide. Furthermore, as the operating system evolves, it will become available on several different computer architectures, including IRSC and new Intel processors. And popular features of OS/2, like the Workplace Shell, will begin appearing in a wide variety of systems and devices, such as DOS and AIX. IBM is fully committed to exploiting emerging hardware and software technologies that customers want.

OS/2 WILL MAKE A GOOD SYSTEM EVEN BETTER Future versions of OS/2

will include a number of improvements targeted at improving performance and fully exploiting OS/2's 32-bit architecture, the two major requests from the growing installed base of users.

These upgrades will include features like a completely new graphics engine with superior screen display and more flexibility for OS/2 developers. OS/2 will expand support for Windows. It will also include multimedia extensions (previously available separately) to integrate sound, video and text.

OSZ WILL ENHANCE WINDOWS FUNCTION ON THE WINDOWS FUNCTION ON Support for Windows 3.1 environment under OS/2 will give you much more than just Windows. By running Windows 3.1 applications under OSZ, you will get all of the benefits of the DOS graphical user interface within the framework of a true 32-bit operating system. OSZ's WIN-OS/2 component will run Windows 3.x programs in real and standard mode.

OS/2 will also take best advantage of Windows' under-the-hood features. These include the ability to link "live" copies of files and data between programs with Object Linking and Embedding (OLE.) and Dynamic Data Exchange (DDP). Also, OS2 will include Windows multimedia extensions as well as a set of the Windows 3.1 "applers," including the Calculator, Cardifie and File Manager.

THE GRAPHICS ENGINE WILL BRING STUNNING VISUAL POWER TO 0S/2 The OS/2 graphics engine—

which translates OS/2 commands into what you see on the sercen—will make it possible to create and display sturning images. A full 32-bit implementation of the graphics programming interface, it nonetheless will be fully compatible with 16-bit device drivers. Your existing display drivers will work as well as they do today.

The graphics engine will support higher graphical resolution than was possible under OS/2 previously, while being compatible with your current hardware. The developer will gain more control and more options with the graphics engine since it enables the use of the Padette Manager, which finetunes color schemes. For the user it will offer better looking screens, and maintain tool when you click from one window to another. Users will also notice that graphics will generally paint faster with the addition of the 32-bit graphics engine.

92 08/2 WILL BECOME SMALLER And what do customers want? Consistently, they

want? Consistently, they have told IBM that a good operating system must take up as little space as possible, both in RAM and on the hard disk. At the same time, power cannot be compromised.

IBM has begun work already to shrink OS/2's system memory requirements. Today, OS/2 can run two substantial applications stinultaneously in 6 MBs of RAM. IBM's goal is to match this performance in a + MB system, to cuable users to run OS/2 on smaller, less powerful machines, or free up memory on larger machines.

In addition to shrinking the amount of RAM required by OS/2, future versions will help to further minimize the amount of hard disk space required by the system. Today's OS/2 already allows you to select or omit applets at installation, to use only the features that meet your needs. As you buy more powerful programs to replace OS/2's included applets; it will be easy to reclaim hard disk space. IBM is also looking at new compression techniques that will reduce the system's hard drive storage requirements even more. With these new features, there will be additional space on the hard drive for exciting new 32-bit aunifications.

os/2 WILL BECOME FASTER
In addition to the shrinkmemory requirements,
users can expect increased speed and
performance in both the operating
system and the applications. The result will be faster program loading
and faster performance, especially for
applications that exploit features such
as pre-emptive multitasking, 32-bit
flat memory model, and the High Performance File System (HPFS)—all
features which hold great benefits for
the business user.

As computer bardware pushes the speed envelope, OS/2 will continue to expand device-driver support to take advantage of these new technologies. By replacing 16-bit device instruction sets with the 32-bit graphics engine, OS/2 will fully exploit accelerator cards and other performance-related

OS2 WILL BECOME MORE
PLEASURABLE TO USE
A smaller and faster operating system will be more enjoyable to use in the broadest range of environments, and will be the ideal foundation for new "applets. For example, a FAX application with a Presentation Manager interface and drag-and-drop caughtily is planned.

IBM will also be extending OS/2's object orientation to make the system even easier to master. The dragand-drop capability in the Workplace Shell, for instance, could evolve so that you might drag the title barof a folder onto a primer iron and automatically print every file in that folder. This saves time and lessens the number of commands to execute a function.

IBM is also exploring more intuitive input methods.



hardware technologies. In addition, OS/2 will continue to support new hardware technologies as they emerge in the marketplace. So as new machines emerge, users won't need to relearn basic commands.

OS/2 WILL
CROSS PLAITFORMS
IBM Personal Software
Products will continue
meeting customers' needs by extending
the OS/2 operating system to new computer architectures, including IRSCbased systems like the PowerPC, new
Intel-based platforms, and other emerging platforms. The company intends to
make OS/2 portable and to add support
for multivarecess commuters.

When OS/2 is made portable, you will be able to run DOS, Windows and OS/2 applications across Intel and non-

Intel architectures. thereby closing the gap between the applications you want to run and the hardware you own. In addition to developing a portable OS/2. IBM intends to make the Workplace Shell a common user interface across multiple platforms. For example, the Workplace Shell will be available on the AFX/PC operating system, as well as DOS, OS/2 will also be enhanced to support pen-based com-

puters.

WORD PROCESSING DELUXE

DeScribe 4.0, a full 32- bit application, takes full advantage of the Workplace Shell's dragand-drop functions. Here, a FAX cover sheet object is dragged to DeScribe's insert icon, automatically placing its contents at the cursor point.

OS/2 APPLICATIONS ARE FLOODING THE MARKET
By the end of 1992, there were over 1,000 native OS/2

were over 1,000 native 08/2 applications available. Many of these take full advantage of OS/2's 32-bit memory model and its robust implementation of pre-emptive multitasking. All of them have the potential to enhance your computing environment.

OS/2 applications span the full range of user requirements, from astonishing 32-bit games to powerful word processors like DeScribe to products that introduce a new model for dient-server computing like IBM Database Manager for OS/2. And OS/2 will run your DOS and Windows applications transparentty, combining the new generation of powerful 32-bit applications with your current software.

7 OS/2 WILL BRING MULTIMEDIA AND NETWORK-ING INTO THE FOREFRONT

Soon, OS/2 will make it even easier for people to tap into the power of multimedia and networking. Upcoming versions of OS/2 will incorporate multimedia extensions into the base operating system, with no rewiring required. This means that users will be able to interact with the computer in a more natural way, using speech and audio to direct the activities of the OS/2 Workplace Shell, Users will also be able to play movies on-screen from either remote or local video files at rates in excess of 15 frames per second, fast enough to eliminate the jerkiness associated with motion video on computers today

IBM also intends to make OS/2 "LAN ready," so that when it's installed as a network client, the client

like speech, pen and touch

MAJOR DISCOVERY

OS/2 Multimedia can belo you to rediscover history. Here, with IBM's "Columbus" application, OS/2 displays images, sound and text in ways that other systems do not permit: to take you back in time.

computer will automatically recognize the network. To do

this, IBM expects to use some functions available in OS/2 Extended Services today, along with new capabilities in development. A "LAN ready" version of OS/2 would recognize Novell NetWare* and other network operating systems. as well as IBM LAN Server networks. Installation and configuration of local area networks will be much easier for users and administrators

OS/2 IS THE BEST PLATFORM TO EXPLOIT MULTIMEDIA Multimedia computing has received a great deal of attention in the last year, as vendors introduce new and sometimes conflicting standards. OS/2 is unique among multimedia products in its ability to support robust multimedia applications without any loss in content quality or performance.

Because OS/2 can run multiple processes simultaneously, OS/2 multimedia applications can simultaneously pull video threads and audio threads, from remote (networked) sources or the local hard drive, without causing any of the jerkiness or freezing associated with other operating system platforms. With the right hardware, users can even view several video clips simultaneously, scale the size of windows containing video, and modify playback speed without degrading system performance.

OS/2 now has digital sound capability which was previously available as a separate product. Full motion video support will be available later this year, completing the OS/2 multimedia equation.

Special thanks to One-Up Corporation, (800) 678-0187, for compiling screen shots for this supplement.



IBM WANTS YOU TO STAY IN TOUCH IBM wants OS/2 to fulfill

your expectations of a superior operating system, and it can only do that if you give the company your input about OS/2. What do you like about the system? How could it be improved? Is there something missing that you need for your specific task? Is there something about OS/2 that could be

simplified? Can we improve the interface? If you haven't worked with OS/2 what has prevented you from giving it a chance? IBM will use this information for the development of future versions of OS/2.

There are many ways to communicate with IBM. Perhaps the easiest way is through the OS/2 forums on CompuServe and other BBSs. Here, users can make comments or ask questions about OS/2 and

receive a direct response from the IBM OS/2 support staff.

You can log on to the IBM CompuServe forum by typing GO IBMOS2. If you're thinking about purchasing OS/2 and have questions, give IBM a call at (800) 3IBM-OS2 (342-6672), lu Canada, call (800) +65-7999. If you've already purchased OS/2 and have a mestion, call the IBM toll-free support number that came in your package.

FOR MORE INFORMATION ... If this supplement has whetted your appetite for information about OS/2, it's easy to find out more.

Since most OS/2 sales occur in computer stores, a retail sales representative can answer your questions and give you a demonstration of OS/2. For the name of a dealer near you call the IBM Business Partner Locator at (800) 426-9292

If you can't get to a computer store, additional information about OS/2 is available from the IBM Order Center. This group takes your order for a copy of OS/2. To reach the IBM Order Center, call (800) 3IBM-OS2 (342-6672)

For IBM technical manuals on OS/2 and other IBM products, call PC Books, the distributor of IBM publications, at (800) 426-7282.

To access the OS/2 forums on CompuServe, type GO IBMOS2, Subscriptions to OS/2 Developer magazine

are \$39,95 for four issues or \$9,95 per issue, To subscribe, call (800) WANT-OS2 (926-8672) or FAX (708) 647-

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For more information or to enroll in the IBM Worldwide Developer Assistance Program, call (407) 982-6408 or FAX (407) 443-4233.

In Canada, call (416) 946-3786. You can also enroll through CompuServe by typing GO OS2DAP. To learn more about the Technical Coordinator Program, call (800) 547-1283.

IBM offers a wide range of courses on OS/2 and other IBM products. These range from technical courses for professional programmers to seminars for end users. To find out more. call (800) IBM-TEACH (426-8322).

If you still can't get the information you need or have a question that doesn't fall into any of these categories, contact the IBM General Information Center: (800) +26-3333, In Canada, call (800) 465-7999.

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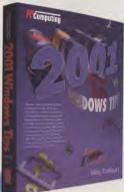
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HP's LaserJet 4 Breakthrough!

Four times the resolution of a LaserJet III, built-in Windows

TrueType fonts, and more—all at an unbelievably low

price. Is this the best printer bargain yet?

HAVEN'T WE HEARD THIS BEFORE?

Hewlett

Packard unveils an all-new LaserJet—and, once again, it changes everything. The company's new faster-bettercheaper printer is the LaserJet 4. And there's no question about it: This is the best laser printer value on the market.

For starters, you won't see better-looking print from a business laser printer at any price. Full 600-by-600-dot-per-inch resolution, implemented in hardware without PostScript, assures excellent print quality. Couple that with a \$2,199 list price—nearly \$200 less than the \$2,395 LaserJet III—and your purchase decision becomes obvious. What's more, vendors aren't hesitating to discount the LaserJet 4. Our check of street pricing revealed prices as low as \$1,399.

Still not convinced? Hewlett-Packard packed in some other features to persuade you. If you've ever wanted additional typefaces, your wish has just been granted. The LaserJet 4 comes with 45 ROM-resident scalable

BY CYNDY BATES



600-DPI GRAPHICS:







Although differences in print quality are negligible for text, graphics printing quickly demanstrates the advantages of higher resolution.

fonts. The Laser-Jet IIT's PCL 5 and 8 Intellifont fonts made scalable type accessible to just about everyone. The Laser-Jet 4 ups the ante by offering a choice of two scalable-font technologies: There are 35 scalable Intellifont outlines—including Garamond, CG Omega, and Albertus—plus a TrucType rasterizer and the 10 TrucType outlines found in Windows 3.1, including Artial, Times New Roman, Symbol, and WingDings. Try not to use them all in one document.

There's more, too. The LaserJet 4 comes with Intel's fast 20MHz 80960 RISC processor, an improved version of PCL5 (printer control language) with increased speed and data compression, a bidirectional parallel port, and an enclosed 250-sheet paper drawer. It's no wonder HP is discontinuing the LaserJet III. There's not much reason to buy one any longer.

DRIVING THE POINT HOME

An important part of what makes the LaserIet 4 superior to other 300- and 600-dpl lasers is its brand-new Canon print engine, the LBP-EX, which prints 600 dots horizontally and 600 dots vertically. Although the tabble size version of this engine shows up in other mathfacturers' models—such as QMS's HammerHead, Xante's Accel-a-Writer \$100, NewGen's Turbo'R B-series, and CalComp's CLC-600—their prices range from \$8,995 to \$4,495. HP is the first company to ship a 800-dpl laser with a smaller, less expensive legal-size print engine for business peculiar.

Why choose 600 dpi? HP's huge laser printer market share and the Laser-let 4's low price are likely to cement 600 dpi as a business standard. What's more, you can still print at 300 dpi with the Laser-let 4 if you're satisfied with that resolution. In fact, the Laser-let 4 if you're satisfied graphics print quality is better than other 300-dpi lasers we've examined. But after you've seen 600-dpi output, you may change your mind: The boost in graphics print quality is evident at even a cursory glance. And there's no significant performance loss at 600 dpi.

The Canon LBP-EX can cram four times as many dots in the same space at 600 dpl as 300-dpl print engines can—that is, 360,000 dots versus 90,000 dots. To put it another way, a 600-dpi engine can place four dots in the same space that a 300-dpl engine prints just one dot. Finer dots and dot placement result in crisper text and graphics. Serif text on the Laserdet 4 retains its fine lines and stroke weights, even in 6-point type. Large display twee is black and has very sharp edges.

But you'll really notice the difference with grayscales and graphical images. Since laser printers can only simulate gray by alternating black dots with nonprinted white areas, a 600-dpi printer has a significant advantage in the dithering process: It alternates smaller, more closely spaced blacks and whites to fool the eye. Grayscale dithers are finer and less obtrusive at 600 dpi on the LaserJet 4, and fine lines in images are clear and solid around the edges. It's hard to beat true 600 dpi like the LaserJet 4's for graphics printing. And the hardware winds up being less expensive for users. The LaserJet 4's text and graphics print quality is unparalleled in its class and price range and price range.

BUILT FOR SPEED

The chief advantage of the LaserJet 4's built-in True-Type rasterizer and fonts is faster printing under Windows 3.1. Our Microsoft Word for Windows 2.0 test document, which uses three TrueType typefaces at four point sizes, printed about twice as fast on the LaserJet 4 than it did on the LaserJet III (see "LaserJet Time Trials: Fast on the Draw," at right, for specific print-test times.) This significant LaserJet 4 speed advantage is a direct result of two things: built-in TrueType and the fast RISC mrosessor.

The new LaserJet's Intellifont and TrueType scalablefont options mean that you won't need PostScript as a scalable-font technology for most business applications. TrueType, Intellifont, and even ATM offer scalable fonts at a fraction of the cost of PostScript. While the LaserJet 4's PostScript option is a well-designed PostScript Level 2 SIMM upgrade, it'll set you back an additional \$499. TrueType and Intellifont are free, and ATM costs only \$99. Unless you're a desktop publisher who needs to proof documents before they go to a Linotronic imagesetter, the chief advantages of PostScript—printer-independent document portability and the vast library of Adobe typeRees—probably aren't worth the corn't worth

Hewlett-Packard designed the LaserJet 4 with performance in mind. At 900 dpi, the LaserJet 4 must process four times the amount of data per page as a 900-dpi printer. Printing a 800-dpi document without enhanced performance would be like running the 100-yard dash with a printer on your back. Hewlett-Packard tuned Enhanced PCL 5's handling of HP-GL2 vector graphics to minimize this performance hit. And the LaserJet 4's 20MHz RISC processor, which is much more powerful than the LaserJet III's 16MHz Motorola 68000 processor, doesn't hurt either.

PC/Computing's performance tests show that HP succeeded at making the Laser-Jet 4 print 600 dpi as fast as other printers print 300 dpi. We tested the Laser-Jet 4, the Laser-Jet 4, the Laser-Jet 1II, and nine PCL 5 competitors (see reviews, "10 Top Contenders," page 249), and although the Laser-Jet 4 wasn't the swiftest shark in the pack—the 10-page-per-minute Epson EPL-8000 carried that distinciming the content of the content of the swiftest shark in the pack—the 10-page-per-minute Epson EPL-8000 carried that distinciming the content of the swiftest shark in the pack—the 11-page-per-minute Epson EPL-8000 carried that distincipation for the swiftest shark in the pack—the 11-page-per-minute Epson EPL-8000 carried that distinct on-life that distinct on-life that distinct the swiftest shark in the pack—the 11-page-per-minute Epson EPL-8000 carried that distinct on-life t

Hewlett-Packard artfully designed around other trade-offs relating to high-resolution printing. Four times the resolution of 300 dpi also means four times the amount of printer RAM, generally around 6MB, that might be needed to store pages temporarily as they're printed. According to HP, it circumvented this problem by building data compression into Enhanced PCL 5 the LessorJet 4's standard 2MB of RAM. The new LaserJet has built-in programming that gauges whether compression is necessary for each individual print job. Called adaptive compression, it enables the printer to compress files up to a ratio of 4-to-1. The process takes place automati-

LASERJET TIME TRIALS:

FAST ON THE DRAW

When you talk about Hewlett-Packard LaserJet 4 performance, you've got to talk about fants. Under Windows, that means the LaserJet's ten ROM-resident TrueType fants and rasterizer. It also means stantificantly faster Windows printing.

The Laserder 4 printed our Microsoft Ward for Windows 2.0 test document (with three TrueType typefaces in four point sizes) in just 52 seconds at 300 dots per inch. Surprisingly, printings of 600 dpi slowed the printer by only a secand. The Laserdet Ill took almost 105 seconds to airoit the same inh.

The powerful 20MHz 1960 RISC pracessor plays an important role in making the Laserlet 4 faster than its predecessor. The amount of time that elapses before the first page of a document prints is the best measure of pracessing speed. The Laserlet 4 casterized and printed the first page of the test document in anly 38 secands at 300 daj, while the Laserlet III took 81 secands.

Onboard TrueType fants are also instrumental to the Laserjet 4's great performance under Windows, because ROM-resident scalable lasts save the time required to generate and download bitmapped fants. Another advantage of the Laserjet 4's TrueType support is that it ellinquishes cannot of the computer fister—after just 5 seconds with our test document. The Laserjet III field up our 486DX/33 test system for 52 seconds.

What if you're not using TrueType fants? The same test dacument formatted with Intellifant typefaces printed slightly faster than the TrueType version on the LaserJet 4, cutting the print time by 4 secands at 300 dpi.

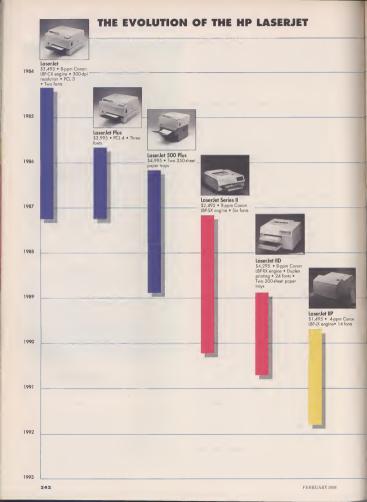
PC/Camputing's text-print perfarmance trials revealed these paints about the laserJet 4:

It greatly impraves print times for documents that use Windows' TrueType typefaces.



This chart shaws page-per-minute rate at which the Laserlet 4 printed a threepage Ward for Windows 2.0 document formatted with TrueType and Intellificnt typefaces. The Laserlet III's rates are shawn as a baseline. The numbers represent the average of two tests Langer bars mean faster printing.

- It's even faster at rasterizing resident Intellifant typefaces than TrueType autlines.
- Its 600-dpi text-printing speeds are virtually as fast as its 300dpi print times, and any discernible difference in print quality is negligible.
- It autstrips the LaserJet III's text-printing performance an all caunts by a wide margin.
- Althaugh ATM 2.5 significantly baasts LaserJet III perfarmance, a prerelease version actually slawed the LaserJet 4's print times.



DOWN THE LASERJET GENERATIONS

Hewlett-Packard LaserJet printers have a rich and lengthy heritage. At any given paint aver the last nine years, HP was marking time with a great selection of laser printer models.

The Original LaserJet. Despite having just twa fants, the first LaserJet was an innovation.

The LaserJet II. The secand generation was enarmously successful and an instant standard.

The Persanal LaserJets. These smaller, cheaper, slawer

lasers were and are perfect for the desktap.

The LaserJet III. Hailed as a majar improvement, the third wave af LaserJets affered scalable fants.

The Network LaserJet. The stalwart LaserJet IIISi defined netwark printing with its 17-ppm print speed.

The LaserJet 4. The best LaserJet that ever was, and the first of a new generation.



LaserJet III \$2,395 • 8-ppm Canar LBP-SX engine • PCL 5 • 14 bit-mapped, 8 scalable fants • Resolution Enhancement technology



LaserJet IIID \$3,595 • 8-ppm Canan LBP-RX engine • Duplex printing • Twa 200-sheet paper trays



LaserJet IIISi \$5,495 • 17-ppm Canan (8P-NX engine • 14 bit-mapped, 13 scalable fants • Microfine taner • Twa 500-sheet paper trays



LaserJet IIIP \$1,595 • \$1,499 • 4-ppm Canan LBPLX engine • 14 bitmapped, 8 scalable fants



LaserJet IIP Plus \$1,249 • 4-ppm Conan LBP-LX engine • 70-sheet paper tray



LaserJet 4 \$2,199 • 8-ppm Canan LBP-EX engine • 600-dpi resolution • Enhanced PCL 5 • 45 scalable fants • Micrafine taner

cally—and transparently to the user—as the printer analyzes the raster page data.

Enhanced PCL 5 also continues the use of banding techniques begun with earlier models to hasten print times on complex pages. Instead of rasterizing an entire page and storing it in memory, PCL divides the page into a series of bands, or horizontal silices, and works with each in turn. While one band of data is being marked on the engine, the processor is rasterizing the next band. The results are lower memory requirements and better performance.

A \$6 MILLION PORT?

The Bi-Tronic parallel port may have a funny name, but it offers welcome functionality—bidirectional communication and potentially faster printing. Wouldn't it be useful to see a message on your computer screen when your printer is out of paper, sparing you a walk down the hall to discover what's wrong? In addition to receiving data like any parallel port, the LaserJet 4's parallel interface can send messages back to the computer.

The Bi-Tronie port requires no additional hardware to achieve bidirectional communication, but for full two-way communication, but her face requires software support that's not currently available under DOS or Windows. HP includes a DOS utility called Remote Control Panel with the Laser-Jet 4 that lets you change settings like resolution, page orientation, and the default font from your PC. But to receive error messages from the printer, DOS apps need to be written to support the port. The picture is better for Windows users. Microsoft is working on software to fully activate the Bi-Tronie interface under Windows. It's expected to be available in the near future, but possibly only on CommuServe.

In addition to two-way communications, the Bi-Tronic parallel interface handles fast data-transfer rates of up to 156 kilobytes per second—much faster than typical printer parallel interfaces. Computers typically transfer data at speeds ranging from 50 to 150 kilobytes per second, so the LaserJet 4's parallel interface can receive data as fasts at it's sent. Even if PCs could match the Bi-

LASERJET 4:

WHAT YOU GET FOR \$2,199

- 600-by-600-dot-per-inch (and 300-dpi) print resolution implemented in hardware
- Enhanced PCL 5 and a 20MHz i960 RISC processor that prints 600 dpi as fast as 300 dpi
- 35 scalable Intellifont and 10 TrueType fonts
- Foster TrueType printing from Windows 3.1
- Printer RAM-soving file compression
- A fost, bidirectional parallel port
- An internol SIMM upgrode to PostScript Level 2 (\$499)
- An enclosed 250-sheet paper drower with paper gouge
- All of the above for less than the cost of the LaserJet III.

Tronic's transfer rate, the performance gain for most business-printing uses would probably be negligible. As documents become more complex and printers support higher resolutions, transfer rates could become more significant. Hewlett-Packard is correctly planning for the future.

STILL ROOM FOR IMPROVEMENT

No laser printer is better constructed, but there are some things about the LaserJet 4 that we'd like to see improved. The only serious problem we encountered was the LaserJet's tendency to print complex vector graphics files incorrectly at 600 dpi—a byproduct of the banding process—and IP has a fix for the problem.

Banding saves printer memory usage and boosts print performance, but extremely complex vector-based pages printed at 60 opt inay result in a page pund—a partially printed or blank page. Once it starts moving, the print engine can't stop a page to wait for the image processor to catch up when it's rasterizing a complex band of data. When this happens, there's no image to print, so the page is ejected incomplete. Detailed vector-based files, like those you might create in a draw package, are most likely to cause this problem. HPs workaround is page protect, a banding-defeat mode that you select from the LaserJet 4's top-mounted control panel. Page protect slows print times but forces the image processor to build a full page in memory (assuming there's enough printer memory to do so) before the print enoine switches on.

This problem was troublesome because it occurred even with small files. Several of the clip-art samples included in Micrograft Windows Draw, for example, punted on the LaserJet 4. Complexity, not size, was the culprit; one of the files causing the problem was only 14K. If you work with vector-based images and want to take advantage of the LaserJet 4 is high resolution, be prepared to ungrade printer memory.

Our next peeve is case design. The Laser Jet 4 isn't going to win any awards for being eye-eatching. It's boxy, and its plastic doesn't feel as sturily as the LaserJet III's. Moreover, the top cover is attached with a flimsy plastic hinge that doesn't reflect the kind of engineering you'd expect from HP.

Another surprise is that the LaserJet 4 has only one cartridge slot, whereas the LaserJet III offered two. This is less serious than it may sound because the new LaserJet comes with 45 scalable fonts and an internal PostScript upgrade, so there's probably less reason to use even one slot.

We also ranked the new LaserJet's front-mounted 100-sheet multipurpose tray high on our annoyance index. It keeps falling down! The tray is held in place by a spring-loaded clasp released by pressing lightly on the top of the panel, the same way you release the rearmounted straight-paper-path door on the LaserJet III. Just learning on the LaserJet 4 tends to release the multipurpose tray.

A LASERJET WORLD

Once again, Hewlett-Packard has done what it does so well in the laser printer market-provide a whole lot of functionality, before anyone else, at ever lower prices Somewhere down the road, perhaps soon, you can expect 600 dpi to emerge as a requisite laser printer feature. Of less certainty but at least a possibility is that 600 dpi could become a new business-printing standard. High resolution has become increasingly important. It started with the Laser-Jet III's resolution-enhancement features the LaserJet IIISi's microfine toner, and LaserMaster's WinJet high-resolution add-ons for the LaserJet II and III. Then Lexmark's 4029 series, introduced last year. raised the stakes with 600-by-600-dpi resolution under PostScript. The LaserJet 4's 600-dpi capability—at less than the cost of a LaserJet III-may well burst the highresolution floodgates.

Here's something else to consider. High resolution printing isn't the only standard Hewlett-Packard is promoting these days. Last fall, the company announced an agreement with Microsoft to develop standards for Windows-based printing. The first results of the alliance show up in the Laserdet 4's built-in TrueType and bi-directional parallel interface, which may well become an industry standard for printer parallel ports. By the end of the year, we could see other printers with both bidirectional interfaces and built-in TrueType fonts. And sometime soon, you can expect other developments aimed at providing true Wysiwy from display to printed output and new methods for boosting print speeds from Windows.

With all this in the works, Adobe had better look to its guns. The LaserJet 4's high resolution, better handling of vector graphics, onboard TrueType fonts, and low price man advantage PostScript might have for the business user all but obsolete.

To be successful competing against the LaserJet 4, 300-dpi laser manufacturers will have to add value in a big way—particularly in terms of price. The PCL 5 priners that share the LaserJet 45 market currently list for an average of \$2.000. By spring, that figure is apt to fall to \$1,500, with street prices hitting \$1,000. Anyone thinking about moving up to an 8-or 10-ppm laser and who'd be perfectly happy with 300 dpi should hold off until prices hit bottom.

And while you're looking for a deal, don't count the LaserJet 4 out. Most of us probably think we'll get along just fine, thanks, without 800 dpi. High resolution is great, but it's difficult to see a difference between 300 and 600 dpi in the 10- or 12-point text documents most of us print everyday. But with all the other features the LaserJet 4 has to offer and the fact that it costs less than the LaserJet III, it should be hard to pass up. Even if you print mostly text in common sizes, the LaserJet 4 of-first more features, faster performance, and better print quality than even the best PCL 5 printers. It's as if you're getting high resolution for free.

LASERJET 4:



CONTROL PANEL AND DISPLAY The top-mounted cantrol ponel mokes it eosy to change printer settings, and the display is legible from ony angle under most lighting conditions.



ENCLOSED PAPER DRAWER WITH GAUGE The 250-sheet poper drower saves desktop spoce, but slides out easily for refilling. The front-mounted indicator shaws when paper is low.



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10 Top Contenders

Can any other printer even come close to the LaserJet 4?

NOT EVERYONE NEEDS a 600-dot-perinch laser printer. What's more, there's a strong likelihood that excellent deals on 300-dpi PCL 5 lasers will be available following the LaserJet 4's introduction. You can expect street prices on some of the well-rounded LaserJet III competitors to drop to 4-page-per-minute levels.

With that in mind, we surveyed PCL 5 lasers in the 6- to 10-ppm range and discovered 10 that retail for \$2,395 or less. Frankly, comparison with the LaserJet 4 is a little unfair, since we're sure that manufacturers will fire a return volley at it. But if you're in the market for a laser printer right now, these models represent your best options.

To gauge print speed and quality, we tested the PCL 5 clones by printing several documents: a 20-page simple text document to reveal real-world page-perminute ratings, a 10-page WordPerfect 5.1 document for DOS times, and a 10-page



















LASERIET BREAKTHROUGH

Microsoft Word for Windows 2.0 document with True-Type fonts for Windows printing times. To assess text and graphics print quality, we printed a CorelDraw document with a TIFF bitmap, a 50 percent black rectangle, and a 256-step gravscale gradient. Although we found minor differences in text quality, all the printers produced text of sufficiently high quality for business correspondence. Variations in graphics print quality were far more prevalent and were revealed clearly in images that contained highlights and shadows.

You wonder about compatibility when buying a PCL 5 clone laser, but you can rest easy: All the printers passed our PCL 5 compatibility test, and every one supports the same level of compatibility as the LaserJet III. In the fundamentals, PCL 5 lasers are created equally, but the extra functionality, features, and lower prices of some models make them stand out as good values-values that will be heightened if their prices drop.

RECTHED HI-10V

\$1,995 • Brother International Corp. • 200 Cottontail Lone • Somerset, NJ 08875-6714 • (908) 356-8880

IN BRIEF: Inexpensive and fast, the Brother holds its own against the Loserlet 4, but still comes up a little short.

PROS: Good value, and prints faster than the Loserlet 4. cons: Grophic images showed some streoking.

Brother's HL-10V has all the performance, convenience, and price advantages it needs to stomp on the LaserJet III. In fact, the Brother's features mix is so good that it's one of the few printers around that challenges the LaserJet 4. It wasn't the fastest of the three 10-ppm printers we tested, but the HL-10V printed faster than both LaserJets.

Although it has a boxy design and an enclosed 250sheet paper drawer similar to the LaserJet 4's, the HL-10V has a smaller footprint. It doesn't, however, come with as many resident scalable fonts-just 12-but it does have 24 bit-mapped fonts and two font-cartridge slots. The HL-10V front control panel tilts for viewing status messages more easily, and it uses the same simple, one-piece toner cartridge as the Laser-Jet's.

Overall print quality wasn't as good as the LaserJet 4's at 300-dpi output, but text quality compared well, with dark solids and fine edges. And the TIFF image showed a good range of gravscales, although it was slightly dark and exhibited some streaking.

At \$1,995, the HL-10V lists for a few hundred dollars less than the LaserJet 4, and that difference holds up on the street. But while this model represents a good value. we'd also consider the Epson EPL-8000 and probably still opt to spend the extra money on the LaserJet 4.

C. ITOH PROWRITER CI-SE

\$1,695 . C-Tech Electronics . 2515 McCobe Woy, P.O. Box 19673 • Irvine, CA 92713-9673 • [800] 347-4017, [714] 833,1165

IN BRIEF: The ProWriter is on excellent volue for Windows text printing, but the slow processor strikes out on complex document printing

PROS: Lowest-priced printer tested; fost Windows print times. CONS: Slow DOS and grophics printing.

At \$1,695, the ProWriter CI-8E is a bargain, especially for Windows users. You pay in other ways, however, namely in poor performance on graphics and DOS textfile printing. It rated an average 7.6 ppm on straight text, slightly slower than the LaserJet 4's 7.9 ppm. But surprisingly, the ProWriter printed Windows text files faster than many other models, including the LaserJet 4.

Graphics printing is hobbled by the ProWriter's weak 12MHz processor, which isn't even as powerful as the LaserJet III's. C-Tech offers a PostScript cartridge, but we'd recommend a printer with more processing muscle if you're considering a PostScript upgrade. The Pro-Writer's footprint is small, but the paper tray juts out





C. Itoh ProWriter CI-8E

and robs desk space. Also, unlike the HP printers, the ProWriter has separate drum and toner components that entail a messy replacement process.

The ProWriter's text is black with fine edges, even on character serifs. Overall, the ProWriter's grayscales were uniform, almost on par with the LaserJet 4 at 300 dpi, but its dithering pattern isn't as fine.

The C-Tech ProWriter isn't widely available, though we found it at a street price of around \$1,050. The low price and fast Windows print times make it a good personal laser printer for Windows users. And since its street price is significantly lower than the Laserlet 4's, there's a strong argument for considering it if its strengths suit you needs.

CANON LBP-85X

\$2,395 • Canon Computer Systems • 123 E. Poularino Ave., P.O. Box 5048 • Costo Meso, CA 92628-5048 • [800] 848-4123, [714] 438-3000

IN BRIEF: There's nothing strong enough obout this model to recommend it, and it's no competition for the LoserJet 4.

PROS: 12 scalable fonts.

CONS: Expensive; poor grophics print quality.

Canon may be expert at manufacturing laser printer engines, but its laser printer manufacturing and marketing is a whole different story. The LBP-Sex is the company's answer to the LaserJet III, and at the same \$2,395 list price, it's at least a day late and a dollar short.

The LBP-8sx's only notable advantages over the Laser-let III are a few more scalable fonts, slightly better speed, and a few less pounds of weight. Like the C.Itoh ProWriter, it has a slow-as-a-snall 12.5MHz processor, but the LBP-8sx lack he ProWriter's low price. The LBP-8sx provides 12 scalable fonts and two font-cartridge slots, which stand up well against the Laser-let III but pale in comparison to the Laser-let 4's 45 onboard fonts. And the documentation is skidnpy where you might

someday need it the most-troubleshooting.

Although the LBP-8sx's text quality was acceptable, its fine lines tended to be spidery and the black areas on the vector graphics test document were washed out.

The Canon skated on thin ice by competing with the LaserJet III, and there's just no contest against the LaserJet 4. Don't buy this one.

EPSON EPL-8000

\$1,699 • Epson America • 20770 Modrono Ave. • Torronce, CA 90509-2842 • (800) 922-8911, (310) 782-0770

IN BRIEF: This is a great printer, offering excellent speed, exceptional 300-dpi output, a long warronty, and superb price.

PROS: Fostest printer in the group; low price.

CONS: None.

The fastest printer in our roundup, the Epson EPL-8000 blew away even other 10-ppm printers. It printed our test documents several seconds faster than its competitors and managed a whopping 9.8 ppm.

Aided by its fine MicroArt toner, the EPL-8000's output quality is excellent. Though on the thin side, its characters were crise with exceptionally detailed serifs. Graphics showed a wide range of grays from light to dark, and dithering patterns were uniform.

The EPL-8000 offers a nice mix of features: a 16.7MHz processor, 13 scalable fonts, one HP-compatible font-cartridge slot, and two proprietary slots for adding emulations, including PostScript. Epson offers a two-year warranty on the product, double the industry standard of one year—a nice plus. The EPL-8000 provides a 250-sheet enclosed paper drawer in its medium-size case, and its control panel is located on top for easy access.

Perhaps some future Epson model will compete head on with the LaserJet 4. If the EPL-8000 were capable of 600-dpi output, it would give the LaserJet 4 a serious run for the money. It already outstrips all the rest.



Epson EPL-8000

PCL 5 LASER PRINTER FEATURES AND RATINGS

			_		
	Brather HL-10V	C-Tech C. Itoh ProWriter CI-8E	Canon LBP-8sx	Epson EPL-8000	Hewlett-Packord LaserJet III
List price	\$1,995	\$1,695	\$2,395	\$1,699	\$2,395
FEATURES1					
Print speed—rated/tested	10 ppm/8.7 ppm	8 ppm/7.6 ppm	8 ppm/7.6 ppm	10 ppm/9.8 ppm	8 ppm/7.5 ppm
Processor	16MHz 68000 Motorola	12MHz 68000 Motorola	12.5MHz 68000 Motorola	16.7MHz 68000 Motorola	16MHz 68000 Matorola
Standard RAM/moximum RAM	1MB/5M8	1M8/5MB	1M8/4M8	1MB/7,5M8	1M8/5MB
Scoloble fonts	12	8	12	13	8
Interfaces	Parallel, seriol	Parallel, serial	Parallel, serial	Parallel, serial	Parallel, serial
Footprint (in squore inches)	231	246	340	284	342
Weight (in pounds)	37	31	44	40	50
Poper capacity/input type	250 sheets/ adjustable drawer	250 sheets/tray	200 sheets/tray	250 sheets/ enclosed drawer	200 sheets/tray
Cortridge slots	2 HP compatible	2 HP compatible	2 HP compatible	1 HP, 2 praprietary	2 HP
PastScript upgrade	Cartridge	Cartridge	None	IC card	Cartridge
Special features	Auto-interface and auto-emulation switching	N/A	N/A	Microfine taner	N/A
EDITORS' RATINGS					
Print speed (based on tested ppm)	2	4 .	4	1	5
Print quality	5	3	5	2	3
Erganomics	1	3	4	2	4
Warronty and support	2	2	2	1 '	2
Overall volue	3	3	5	2	4

1All models (except the HP Laseder 4) are 300-dpi laser printers. All provide characteredge enhancement for smoothing curved or angled type edges similar to that of the Hewlett-Packard Laseder HTS Resolution Enhancement behanology. All models after the data-compression and font-caching capabilities found in HP's PCL 5.

EPSON'S EPL-8000:

THE BEST VALUE AMONG PCL 5 COMPATIBLES

Mast of the PCL 5 printers we reviewed campete with the Lastefel III with similar bare-banes configurations. They similar pole in camparison to the Lastefe 4's print quality, feature set, and print speed. Not the EPL-8000, however—it has it all: a law price, killer performance, excellent print quality, and a generous feature set.

What really stands out about this printer is its law \$1,699 list price—and just because it's one of the lowest priced print are we reviewed, but also because the list price used to be \$1,999 and Epson out it by \$300. The price drop represents the beginning of a trend we expect other companies to continue if \$300 debegrich printers are gain to compete suc-

cessfully against the LaserJet 4. Whot's mare, they must affer the price advantage without sacrificing performance ar features. Epsan's EPL-8000 daes just that.

The fastest 300-dpi printer we reviewed, the 10 pageperminute EPL-8000 really-churs out the pages. Aided by microfine toner and edge-enhancement technology, its autput quality is sa fine that it rivals even that of the Lasseful 4 at 300 dpi. Epsan atta includes 13 scalable typefaces and offers multiple slats, both HP compatible and Epsan prapriteary, far frant expansion. Additionally, the EPL-8000 uses a nomess, one-piece toner/drum replacement and has a small facility and a warranty that's vince the ane-year industry If price is your main consideration, you'll want to look at our Best Value, the Epson EPL 8000. But if you want to get the most for your money, nothing beats the new LaserJet 4.

					THE CHAMP
Kyocera	Mannesmann Tally	NEC	Okidata	Tashiba	Hewlett-Packard
Ecasys a-Si	MT 908	Silentwriter Model 95	OL810 LED	Pagelaser GX200	LaserJet 4
FS-1500A			Page Printer		
\$2,395	\$1,995	\$1,749	\$1,699	\$1,799	\$2,199
10 ppm/9.2 ppm	8 ppm/7.7 ppm	6 ррт/6 ррт	8 ppm/8.2 ppm	8 ppm/7.6 ppm	8 ppm/7.9 ppm
16MHz 68000	16MHz 960 RISC	16.7MHz 68000	12.5MHz 68000	16MHz 68000	20MHz 960 RISC
Motorolo	Intel	Motorolo	Motorolo	Motorolo	Intel
1M8/5MB	1M8/5MB	2MB/5M8	1M8/5MB	1M8/5MB	2MB/32MB
13	8	8 Intellifont, 35 PostScript	13	8	35 Intellifont, 10 TrueType
Porallel, seriol	Porollel, seriol	Porollel, seriol, AppleTolk	Porollel	Porollel, seriol	Porollel, seriol
188	256	279	313	246	258
30	31	37	24	31	35
250 sheets/	250 sheets/troy	250 sheets/	200 sheets/troy	250 sheets/troy	250-sheet /enclosed drower and
enclosed drower		enclosed drower			100-sheet multipurpose troy
2 IC cord slots	2 HP compotible	2 HP compotible	2 IC cord slots	2 HP compotible	1 HP
ROM replocement	Daughterboord	PostScript Level 2 stondard	Controller replocement	Cortridge	SIMM, PostScript Level 2
Microfine toner	N/A	Microfine toner, fox	Microfine toner	N/A	600-dpi printing, microfine toner,
		option			odoptive dato compression,
					bidirectional parallel part
2	3	5	2	4	3
3	3	2	5	3	1
1	3	2	4	3	1
1	2	2	1	2	2
2	3	3	4	3	1
				EXCELLENT <	1 2 3 4 5 > DISAPPOINTING



stondard. With its trend-setting price, top-notch print quality, and blozing speed, the EPL-8000 is clearly the Best Value among 300-dpi PCL 5 printers.

An honorable mention goes to Kyocero's Ecasys o.S. IFS-JSOAA for its long-lating drum. The omorphous sillicen drum never needs replacement, and that, combined with the Kyocero's replenishable—not replaceable—laner, cuts down on consumables. The FS-ISOAO's ecological features, quick print times, and law cost-perpage make it worthy, although of \$2,395 if spriced a little high. The low cast of consumables somewhat affests the FS-ISOAO's list price, but Kyocero would do better to follow Eppan's example.

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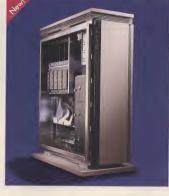
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HP LASERJET III

\$2,395 • Hewlett-Packard Ca., Direct Marketing Organization
• P.O. Bax 58059, MS 511L-SJ • Santa Clara, CA 950518059 • (800) 752-0900

IN BRIEF: This madel has been autmaded by faster, mare pawerful, cheaper printers—and has been discantinued—but units left in stack shauld be priced to move.

PROS: Goad print quality.

CONS: Slow, slaw, slaw,

The LaserJet III is showing signs of age. Not long ago, this printer's performance and features dazzled buyers, but it was the second-slowest printer of the group, besting only the 6-ppm NEC Model 95 in text printing.

Though it's not fast, the LaserJet III's print quality is still up to snuff, with crisp text and uniform grays. Its once market-leading feature set—a 16MHz processor, eight scalable fonts, and IMB of RAM—has become barely average with the introduction of the LaserJet 4. The footprint that once seemed svelte beside the LaserJet II now appears bulky, and, at 50 pounds, it's the heaviest PCL5 laser of the lot.

Despite the fact that the LaserJet III is widely discounted, its high \$2,395 list price handicaps it. Considering the alternative—the less expensive LaserJet 4—there's not much reason to buy the LaserJet III unless you can find it at a very steep discount.

KYOCERA ECOSYS A-SI FS-1500A

\$2,395 • Kyacera Electranics • 100 Randalph Rd. • Samerset, NJ 08875 • [800] 323-0470, [908] 560-3400

IN BRIEF: If yau're willing ta part with same green to be "areen," the fast Kyocera is an excellent chaice.

PROS: Fast, small faatprint, and ecalogically carrect.
CONS: Expensive; camplicated PastScript upgrade.

What other printer lets you print with a clean conscience? The Kyocera Ecosys a-Si's special imaging drum



HP LaserJet III



is made from amorphous silicon and is unlikely ever to need replacing, so you conserve on raw materials by buying it.

While in use, the silicon drum is polished by a special toner that helps it recover from everyday wear and tear. The imaging system is not only ecologically sound but it also costs less to operate, with a per-page average of only 78 cents. Most other lasers' per-page costs are two to three times as expensive. So even though the Ecosys costs more up front, voil Susy in the long run.

Kyocera's "green" printer is fast, losing the text-printing race only to Epson's EPL-8000. Text quality is good, although a little lighter than most others. Also, the printer's strokes and fine serifs tended to be spidery. Graphics quality is exceptionally good and compares with the LaserJet 4's at 300 dpi. Grays were evenly balanced between light and dark, and the dithering patterns were uniform.

The Ecosys, like the Canon LPB-8sx, costs \$200 more than the LaserJet 4, but in our book, its ecological, performance, and cost-per-page advantages warrant extra consideration.

MANNESMANN TALLY MT 908

\$1,995 • Mannesmann Tally Carp. • 8301 S. 180th St., P.O. Bax 97018 • Kent, WA 98064-9718 • (800) 843-1347, (206) 251-5500

IN BRIEF: The MT 908 excels at printing Windaws dacuments and grayscale images, but affers only average value. PROS: Gaad print quality, especially an grayscale images. CONS: Messy toner replacement.

What sets the MT 908 spart is its processor. Like the LaserJet 4, it uses an Intel 960 RISC processor, though the more stately 16MHz version. The fast chip made a noticeable difference in Windows printing times, making it the second-fastest of the 8-ppm clone printers; it printed simple text at a respectable 7.7 ppm.





Print quality is also an MT 908 strength, being superior to most. Text was black, yet it retained fine definition. Graphics quality was good, with uniform, evenly patterned grayscales.

In most other ways, however, the MT 908—with its eight scalable fonts, two font-cartridge slots, and 250-sheet paper tray—is on par with the LaserJet III.

At \$1,995, the Mannesmann Tally is a bit cheaper than the LaserJet 4, and its 300-dpi print quality is comparable. But unlike the Epson and the Brother, the MT 908's performance doesn't beat the LaserJet 4's. It's a good printer—and one you'd likely be happy with—but the LaserJet 4 is still a better value.

NEC SILENTWRITER MODEL 95

\$1,749 * NEC Technologies * 1414 Massachusetts Ave, * Baxbaraugh, MA 01719 * (800) 388-8888, (508) 264-8000 IN BRIEF: If you don't mind slawer print times, the Silentwriter is easily the max versatile printer of the lat, especially far mixed PC and Mac environments.

PROS: Excellent value and print quality; PCL 5 and PastScript level 2 are standard.

CONS: The 6-ppm print speed is slaw far this class of printer.

NEC's Silentwriter Model 95 is a humdinger of a laser printer value at its low \$1,749 list price, especially if DotScFrift is an important consideration. A PC/Computing 200 winner last year, the Silentwriter offers excellent print quality. Text is crisp, and test documents showed a well-defined range of grays. It manages a fine dither on the lightest grays and prints consistently dark blacks. The Silentwriter Model 96 is built around a 6-ppm version of the Minolta print engine found in Epson's 10-ppm EPL-8000, so it's no surprise that the two models offer similarly high quality output.

The only 6-ppm printer we tested, NEC's Silentwriter Model 95 lagged painfully behind the others in performance. Despite its comparatively slow times, it printed simple text exactly at its rated engine speed, 6 ppm.

NEC packs extra value into the Model 95, including. PostScript Level 2, an AppleTalk port, and 35 Adobe Type I fonts for dual-platform compatibility right out of the box. NEC also provides a 16.7MHz Motorola processor for imaging complicated PostScript pages. The Model 96 comes with emulation-switching software, but we'd prefer to see that canability unlemented in hardware.

The Model 95's dual-emulation capabilities and its

WHAT TO ASK WHEN BUYING

A PCL 5 LASER PRINTER

 HOW MUCH WILL IT COST? Unless you're halding out far a specific feature, dan't pay any more than \$1,500 far a PCL 5 laser. You may be able to do even better than that.

- WHAT'S THE PAGE-PER-MINUTE RATING? If you'll be the only
 person using the printer, a 4-to 6-ppm print speed is acceptable,
 but 8 ppm is preferable and is nearly requisite in small, shared
 printing environs.
- WHAT'S THE BASIC CONFIGURATION? The aptimum feature ser varies depending on the user, but mast people can use a loser with scalable fants, at least 1MB of RAM, a 16MHz ar feature processor, and a small footprint. Get mare memory and a RISC processor if you print complex documents.
- DOES THE PRINTER OFFER EDGE-ENHANCEMENT TECHNOL-OGY AND USE MICROFINE TONER? While mast 300-dpl losers provide acceptable print for business needs, choose a printer that offers edge-enhancement capability (as da all those we tested) and accepts micrafine toner (some da). If print quality is an important criterian, give strang consideration to the Losedet 4.
- WHAT KIND OF POSTSCRIPT UPGRADE IS AVAILABLE? The best PastScript upgrades are insatilled internally, like the Laserjet 4's SIMM PostScript level 2 upgrade. With few exceptions, PastScript cartridge upgrades are slaw. If you know you'll eventually be upgrading to PastScript, consider buying the extra printer RAM up front.

LASERJET BREAKTHROUGH

standard 2MB of RAM make it an attractive alternative to the Laser-Jet 4 if you're interested in PostScript or work in a mixed PC and Mac environment. Unfortunately, the 6-ppm speed is slow for that kind of printer sharing. The better option for mixed environments is NEC's 10-ppm Silentwriter Model 97, which was unavailable for testing but includes all of the Model 95's features and more at a \$2,149 list price. On paper at least, the Model 97 stacks up well against the LaserJet 4 if you're likely to need PostScript.

OKIDATA OLSTO LED PAGE PRINTER

\$1.699 • Okidoto • 532 Fellowship Rd. • Mount Lourel, NI 08054 • (800) 654-3282, (609) 235-2600

IN BRIEF: The fost OL810 is a great value, but you might be better off choosing another model to avoid the cleaning bills from spilled toner.

PROS: Great price: fost

CONS: Poor graphics print quality: messy toner replacement procedure

The OL810 may not be pretty to look at, but its low \$1,699 list price, average \$1,100 street price, and excellent performance could help you look the other way.

Hiding under the hood of this 8-ppm printer is a fast LED print engine that prints straight text more swiftly than its rated speed and produces Windows text so fast it nips at the heels of many 10-ppm printers.

The OL810 uses a 12.5MHz processor and offers 13 scalable fonts with two proprietary font-expansion slots. Counter to many of today's smaller footprint designs, the OL810 sprawls out on your desk. At least lifting it isn't too much of a chore, since it weighs only 24 pounds.

It may sound like a trivial complaint, but replacing this printer's toner is an ordeal-it's the messiest method we've encountered. You're almost guaranteed to spill toner when you remove a used cartridge, making the tissues that Okidata supplies in the box very handy.

Perhaps a greater approvance is that its output quality is inconsistent. Text quality is good, but graphics occasionally emerge flawed. While TIFF image grays print. smoothly and are well blended, the overall sharpness of the image deteriorates in places, the grayscale gradients show streaking, and dithering patterns are pronounced.

A \$1.699 list price is right for a fast 8-ppm, 300-dpi PCL 5 laser, but the inconsistent and sometimes poor graphics print quality and messy toner-replacement procedure make it tough to recommend the OL810.

TOSHIRA PAGELASER GX200

\$1,799 • Toshibo Americo Information Systems, Electronic Imoging Division • 9740 Irvine Blvd. • Irvine, CA 92718 • (800) 468-6744, (714) 583-3000

IN BRIEF: The relatively low price might offset this model's slow performance, but you can do better elsewhere. PROS: Fost Windows printing.

CONS: Slow DOS and graphics performance.

Though virtually identical to the C-Tech ProWriter, the \$1.799 Toshiba PageLaser GX200 costs \$100 more. The difference? The Toshiba is powered by a 16MHz processor, while the C-Tech is stuck with a 12MHz chip. Even so, tests show almost no performance advantage for the Toshiba. The two scored almost exactly the same-just a few seconds faster than the Laser Jet III.

The PageLaser GX200 matches the C-Tech's feature set, too, with eight scalable fonts, two font-cartridge slots, 1MB of RAM, a 250-sheet paper cassette, and the same small footprint. And since it uses the same TEC print engine as the C-Tech and the Mannesmann Tally, the PageLaser makes you endure the same messy toner replacement procedure.

At \$400 less than the LaserJet 4, the PageLaser is a viable option. But if you're leaning toward a lower cost 300-dpi alternative, none of these PCL 5 lasers beats the Epson EPL-8000.





Toshiba PageLaser GX200

Four reasons to buy a TI microLaser™ printer.



Now there's a way for you to put the power of Microsoft® Windows™ on paper - microLaser from Texas Instruments.

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Adobe® PostScript® software, microLaser easily supports your demanding applications. And with our Microsoft Windows driver, set it and forget it with all Windows applications.

Not only does PostScript give you scalable outline fonts and graphics, it also means that your microLaser works in computing

environments like Windows, DOS*

Apple* Macintosh*, OS/2* and UNIX*. -Performance When it comes to printing high-quality documents fast. microLaser really makes you look good. At either nine or 16 pages-per-minute, microLaser printers speed you through documents in a hurry. Plus PostScript means what you see on your screen is what you get on paper. You can even turbocharge your microLaser with a RISC processor for blazing fast graphics. 3. Reliability When you buy a printer, you want it to print. And

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1-800-527-3500.

The microLaser PS17 has earned the 1990 PC World Best Buy award; microLaser PS35 has earned the 1990 InfoWorld Excellent Value award and 4½ mice from MacLiser. October 1990.





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486DX/33 Laptop Issue,

September 1992

books what Griselda of Skyland was to Pomoraniane the lightest.







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486SX/33	INTEL 80486SX-33 MHZ, BUILT-IN 8K CPU CACHE	4 STANDARD, 8 8:20 OPTIONS	130	25+	:1,999 \$74mo
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Best Buy. December 1992









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486SX/33	INTEL B0486SX-33 MHz WITH BUILT-IN BK CPU CACHE	4 STANDARD, 32 MAX	80	AS ABOVE	16 BIT SVGA CARD/ 14" 1024 X788 SVGA COLOR MONITOR	11199 544/mo
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GATES

How MS-DOS made Bill Gates the richest man in America—the inside story of Microsoft's early years.

BY STEPHEN MANES & PAUL ANDREWS

In mid-1975, Bill Gates and his childhood friend Paul Allen libensed their version of BASIC to a small Abhupurque, New Mexico, company called MITS for its new Altair microcomputer. They subsequently formed a partnership and christened the venture Microsoft Bill Gates was not yet 20 years old. In 1978, Microsoft had its frist \$1 million year in sales, by 1984 it had its frist \$100 million year. In the fall of 1992, Gates was designated the richest person in America by Forbes magazine, with a personal fortune of around \$5 tillion.

We all know that Bill Gates is rich and that his company is phenomenally successful. We'e followed his exploits as he courted and then challenged both IBM and Apple. We've heard about his obscenely expensive but undrivable Porsche and the digital Xunada he is builting near Seattle. But is he truly a visionary or merely adept at reacting to what the real innovators are doing! And exactly how did he turn someone else's thorny operating system into a fortune that exceeds the GNP or some small countries?

This month we present the first of a two-part look at a candial definitive, nean 5.15-page biography of Microsoft's controversial leader: Gotes: How Microsoft's Mogul Reinvented on Industry—and Mode Himself the Richest Mon in America, by computer journalists Stephen Mones and Pout Andrews. This edited and condensed installment highlights the development of POS and offers behind-the-seeness accounts of tife at Microsoft. Next month's except will reveal the true story behind Gates's involvement in the development of Windows.

Y EARLY 1980 the five-year-old personal computer business was doubling annually, with pundits predicting a billion-dollar vear for 1981, Radio Shack led with about 40 percent of the market. Number-two Apple was on its way to 1980 revenues of \$117 million and a net profit of \$11.7 million, Thirdplace Commodore fared better in Europe than at home. The rest of the market, a motley variety of businessoriented computers with disk drives, coalesced around Digital Research's CP/M operating system, Hewlett-Packard, Wang, Xerox, and DEC all had microcomputer projects in the works by midvear.

And so did IBM. Its plans for home computers had gone as far as prototypes—wild, goofy designs that looked great with kids. Around the Fourth of July 1980, Bill Loweth editrector of IBM's Boes Raton labs, got word of a proposal from Atari, whose Model 800 computer was considered an up-and-comer. Atari suggested that IBM should "OEBM" the

Adapted from the book, Gaiss: How Microsoft's Mogul Reinvented an Industry and Made Himself the Richest Man in America, published by Doubleday. © Copyright 1988 by Stephen Manes and Paul Andrews.

MS-DOS THROUGH THE YEARS

Compiled by Christine Grech





Bill Gates and Paul Allen come face-toface with a Teletype at Lakeside School in Seattle.

In eleventh grade. Bill hires underclassmen to analyze traffic tapes from roadside boxes. By 1973 his Traf-O-Data company builds a automate the process.



Bill is a congressional page for the summer. He shows his business prowess by buying McGovern-Eagleton campaign buttons and reselling them at a profitmuch less than often reported-when Eagleton is forced off the ticket.

1972





1968

machine: Slap its logo on the box and market the unit as its own.

In mid-July Lowe and his boss Jack Rogers took a variant of this proposal to IBM's august CMC, the Corporate Management Committee that wielded life-and-death power over major projects. Frank Carv. chairman of the board, shot down the idea. He wanted to know why the world's largest computer company couldn't design and market a lowend machine of its own.

IBM's low-end Datamaster project, underway for more than two vears already, had consumed vast resources with no end in sight. When Cary muttered about projects taking 300 people three years, Lowe stuck his neck out: "I said, 'No, sir. You're wrong. We can get a project out in a year." Next thing Lowe knew, he was assembling a task force to consider a crash program for an IBM personal computer.

Back in Boca, Lowe rounded up a dozen men he trusted, mostly mayericks known in IBM parlance as "wild ducks." What became clear at

the weekend session was that to meet Lowe's one-year timetable. the new machine would have to be built from off-

the-shelf partsboth hardware and software. The task force became known unofficially as the Manhattan Project.

southerner Jack Sams, a twenty-year IBM veteran with a strong background in operating systems. was chosen to head up the soft-

ware effort. On Monday, July 21, 1980, Sams phoned Microsoft. He needed to see Bill Gates, and

he needed to do it tomorrow.

In their straight-arrow-down-tothe-wingtips all-business uniforms. Sams and an IBM contracts administrator arrived at Microsoft on



Bill (lower right), age 10, as a Cub Scout. In just 10 years he'd be on his way to becoming a hillionaive

Tuesday, July 22, and were quickly introduced to a young fellow in an ill-fitting suit, "I thought

he was the office boy," Sams recalled. But Bill Gates quickly dispelled that notion. "He was obvi-



January With the help of

1975

Harvard student
Monte Davidoff, Bill
and Paul begin work
on the first
commercial software
for the PC; a version
of BASIC for the new
MITS Altair, the
machine that is
generally credited
with starting the
personal computer
revolution.

February

Bill writes "An Open Letter to Hobbyists." The broadside against software piracy is published most prominently in the newsletter of the Homebrew Computer Club, the pioneer computer users' group.

August

Microsoft's second computer language, FOCAL, is released. It does not sell a single copy.



January Bill leaves Harvard at the end of his sixth

April Microsoft's third language, FORTRAN, is





1770

1976

ously in control. He's one of the smartest men I've ever known,"

Gates had his assistant Steve Ballmer join the meeting. The first order of business was a two-page IBM agreement stipulating that neither party would be free to disclose any proprietary information, that either party would be free to disclose what was discussed, and that "IBM also wishes to make clear that no further activity is to be guaranteed as a result of this initial meeting." Ballmer and Gates signed without hesitation.

To avoid tipping his hand, Sams dropped hints that IBM was considering an experimental project—possibly a plug-in board that mightle let users run 8-bit CPM and BATC on IBM's already released 16-bit Displaywrite word processor. Sams had used some of Microsoft's products; he was looking for reassurance. Could these guys meet deadlines? Would their security meet IBM standards?

On most counts Microsoft passed.

Sams had expected to find fifteen employees instead of forty, rinkydink offices instead of pleasant ones. As for deadlines, Gates displayed a roster of over a hundred customers to whom Microsoft had delivered software more or less on schedule.

Security? Outside Bill's office was an open area full of unreleased machines, mostly Japanese. Nothing stood in the way of anyone who wanted to swipe an idea or an entire design. For IBM, other arrangements would obviously be required.

When Microsoft's Japanese agent Kay Nishi stepped in demonstrate the Oki IF-800 machine, it became clear that Gates and his crew also knew plenty about hardware design. Sams got an earful: Gates pushed hard for color graphics, for a built-in serial-number chip that would help minimize his longtime bugaboo, software piracy—and for a 16-bit design.

The men in the dark suits flew home with a sense of a new worldthis youthful, vital little company where the employees walked around in garb and hairstyles utterly taboo at IBM. Sams was energized by Bill's openness, his forthrightness, his fascination with the inner workings of IBM.

For Bill Gates, this was the ultimate client, the coolest deal a little software company could dream of making. Besides, in his own IBM way, Sams seemed like a Smart Guy. "We loved Jack Sams," Gates said. "We thought he was a cool guy, 'cuuse he was so nice to us."

The Manhattan Project reconvened in Boca, convinced that IBM's earlier small-systems efforts had failed in part because nobody was writing software or developing add-on hardware for them. By designing the PC around open hardware and software architectures and publishing the specifications, IBM would encourage third parties to add value to the new systems.

Lowe went to the CMC on August

MS-DOS THROUGH THE YEARS



January

Microsoft moves its headquarters from Albuquerque, New Mexico, to Bellevue, Washington.

July Microsoft meets

with IBM about developing BASIC for what will become the IBM PC.

November

Microsoft signs contract with IBM for developing programming languages and an operating system.

July

Microsoft buys all rights to 86-DOS from Seattle Computer Products .

August

IBM announces the PC, with DOS 1.0.

April

GW-Basic 1.0 is introduced. GW stands for Gee Whiz.



MS-DOS 1.2 released.

August

Microsoft Multiplan, the first spreadsheet from Microsoft, is introduced.

1979

1980

1981

_

1982

6 with the group's presentation. The specs; 32K of ROS (read-only storage. IBM's unique acronym for what. everyone else called ROM), 16K of RAM, a six-slot open bus, and a variety of options: RAM up to 256K, a printer adapter, a choice of color or monochrome display, 8-inch disk drives, a floating-point processor to speed up math-intensive work, and an "auxiliary user interface"-a jovstick. The six slots became five, the 8-inch drives shrank to 51/4s, but otherwise the proposed machine was virtually identical to the final IBM Personal Computer.

The chip meant to power all this was Intel's 16-bit 5088, which could directly access a megabyte of memory, a sixteenfold advantage over the 64K of the 8-bit world. As Bill Gates was among the earliest to recognize, this huge expansion in memory capacity would be perhaps the single most important factor in the IBM machine's success.

In later years Gates would claim

credit for the selection of this chip, insisting that the IBM plan had initially been a lame 8-bit design. The claim was understandable but wrong. At the first meeting Sams and Harrington had hinted at an 8-bit project to throw Microsoft off the seent. Gates did push for a 16-bit design, and, as Sams put it, "I'm sure woodded." But "it was redundant." IBM's engineers had used an 8-bit chip in the Datamaster fiasco. They weren't about to do it again.

For a meeting in Seattle August 21, IBM sent along a three-page document detailing new nondisclosure terms. Despite the agreement's one-sidedness, Gates signed it without modification. It set the pattern of Gates's relationship with the Blue Monster: Get the business first and

This time each side fielded a fourman team. IBM revealed what it was up to, declaring that Microsoft was its first choice for computer languages—not just interpreted BA-

worry about refinements later.

SIC, but the whole product line: CO-BOL, FORTRAN, Pascal, and the BASIC compiler. "We were walking around like it was too good to be true," recalled Microsoft's Mark Ursino, "because we'd essentially done a handshake deal on \$600,000 of software."

But there was one essential missing item IBM would clearly need: an operating system. Sams asked Gates if Microsoft could sublicense the CP/M it had been selling with its SoftCard.

No, Microsoft could not Besides, it wouldn't work on the 16-bit 8088; CPJM, Bill explained, was an 8-bit operating system. But Digital Research had a long-overdue 16-bit version called CPJM-86 in the works, and Bill would be happy to phone and find out how it was coming along, After all, without an operating system, there was no way he could peddle his languages.

Gates told Digital Research's head, CP/M's creator Gary Kildall,



January The microcomputer

makes the cover of Time magazine as Machine of the Year.

Lotus 1-2-3 is released.

February IBM releases the XT, complete with DOS



March

Microsoft founds Microsoft Press.

April Microsoft Mouse is introduced.

November Microsoft Word 1.0 is January

Apple introduces the Macintosh, and Microsoft releases its first Macintosh products; BASIC and Multiplan, These are followed by Word. Chart, and File.

March DOS 2.1 is released to support the PCir.

April Bill makes the cover of Time

August DOS 3.0 is released.



August IBM introduces the AT, based upon the Intel 286 chip.

1984

that he had some important visitors who needed an operating systemcustomers from IBM. Could they come down and visit the next day? Kildall said he'd arrange it, and Bill's guests flew south to California.

The next day's events have become the industry's Rashomon, its most-rehashed story. Bill Gates would later relish describing the situation as "Gary went flying." Kildall would put his own spin on it.

It was the deal of the century. For a grand total of \$75,000 Microsoft now owned DOS lock, stock, and barrel, Bill Gates would go on to make DOS the foundation of his empire.

What really happened? Something very much like this:

At the Victorian home in Pacific Grove that served as the headquarters of Digital Research, four men in dark suits stepped out of a dark

Chevrolet sedan. To the jeans-wearing, late-hippie Digital Research stalwarts, they looked like representatives of the hated FBI-or narcs.

Gary Kildall had gone flying, all right-on business. He flew every chance he got, and he had previously scheduled engagements in the Bay Area. To Kildall, IBM was just another customer, a customer that was likely to screw up whatever it was plotting now just as badly as it had

screwed up the 5100. its first small-computer effort.

Besides. Kildall was a technical guy. His wife, corporate vice president Dorothy McEwen, generally did the dealing, and she had plenty of experience handling big companies. If the IBM people needed technical guys, there were plenty around the office. So technical support rep Phil Nelson

and McEwen were the ones who

ushered the IBM group into the former dining room that served as the conference room.

IBM's attorney handed McEwen the nondisclosure agreement. She found it ridiculously one-sided. The discussions, it said, would "not serve to impair the right of either party to make, procure, and market products or services now or in the future which may be competitive with those offered by the other." In other words, as McEwen saw it, we can tell you what we're doing, and you can go off and do it without us? Forget it!

Sams and the other IBM emissaries cajoled, pleaded, tried to convince McEwen to sign. She phoned attorney G. Gervaise "Gerry" Davis, who sat on the board and was a principal of Digital Research, He suggested alternative language that IBM's lawver wouldn't accent.

The group recessed for lunch. When the meeting reconvened, IBM's attorney asked whether McEwen was now ready to sign the

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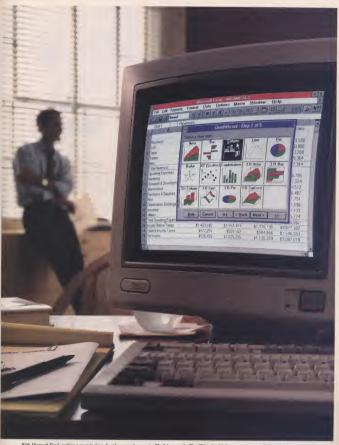
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October Bill turns 30. appearing at party as Jay Gatsby.

Intel announces the 386 chin

November

Windows 1.0 released.

original agreement, McEwen and

Davis had worked out modifications

over the lunch hour, but IBM

wouldn't accept them; the stalemate

continued. Finally a member of the

IBM group came up with another

approach merely to get something

MS-DOS Version 3.25

January DOS 3 25 is released.

March Microsoft goes public of \$91 a chara and closes at \$28 the

same day. The initial public offering raises \$61 million.



March Bill Gates becomes a billionaire.

April DOS 2.2 is released.

August Microsoft becomes the largest PC software company in terms of sales.

October Excel for Windows is introduced.

1987

May Microsoft sells its one-millionth mouse.

August DOS 4.0 is released.

October OS/2 1.1 with Presentation

Manager is released.

1988

1985

1986

price or a firm date for CP/M-86-or a commitment to the secrecy pact. What ultimately lost the IBM deal

for Kildall wasn't his absence at the first meeting but the lateness of CP/M-86, Had the operating system been ready on time, IBM would have Kildall had his operating system, a version of the PL/I language, and not much else. The kinds of contracts IBM generally demanded, Kildall knew, might mean he'd be signing away his one commercial product forever for one lousy flat fee. He was not alone in spurning IBM's advances

Thursday, August 28, a meeting at Microsoft included Sams, hardware guru Lew Eggebrecht, and three others from IBM. Gates signed a consulting agreement that paid Microsoft the sum of \$15,000 for a month's work. For the first time, IBM fully disclosed to Microsoft the technical minutiae of its plan.

But now one of the foundations of the plan was being called into question. If IBM couldn't find a 16-bit operating system, how could it build a 16-bit machine? Sams wondered if Gotes knew of an alternative.

The Gates luck, sometimes known as his partner Paul Allen, held again. Allen just happened to know of a



Sams was stunned, wondering "My God, what are we going to do now?" He phoned Bill Gates, asking him to get in touch with Kildall, Gates did, and told Sams that the deal didn't seem

dead. But when Sams phoned Kildall, he couldn't pin down a firm



cense it. Besides, for Kildall the IBM deal looked nowhere as good as it did for Gates, Gates had a whole line of languages to offer;

been able to li-

nowhere.



July Microsoft sells its two-millionth mouse.

October Intel introduces the 486 chip.



Windows 3.0 is released.

July

1990

May

Microsoft reports its first \$1 billion sales vear



March Microsoft salls its six-millionth mouse.

DOS 5.0 is released

August Tenth anniversary of the IBM PC.



April Windows 3.1 is released.

July Microsoft reports \$2.8 billion sales year.

1992

1989

mom-and-pop-shop computer engineer who, like IBM, had a 16-bit machine and had been thwarted in trying to buy an operating system for it. The engineer was Tim Paterson of Seattle Computer.

With CP/M-86 late, there was only one major software product that could run on Paterson's 16-bit Seattle Computer machine: Microsoft's Standalone BASIC with its rudimentary built-in operating system. Since that was rather limited, Paterson had set out to clone CP/M. The result was what he called QDOS-Quick and Dirty Operating System.

QDOS wasn't an absolute clone of CP/M. Paterson had decided that Standalone BASIC's File Allocation Table (FAT) scheme was a better way to organize disk information than the way CP/M did it. He had also made modest improvements for users. With CP/M, copying a file from drive A to drive B required the goofy syntax Kildall had adopted from DEC operating systems:

PIP B: A:FILENAME

With QDOS you simply typed COPY A: FILENAME B:

Paterson also changed CP/M's classic A> prompt to A:, borrowed the idea of a command-line editor from Northstar DOS, and added elements from CDOS, Cromemco's CP/M clone. But for programmers' convenience, QDOS mimicked every last internal function call of CP/M.

Seattle Computer's Rod Brock offered Paul Allen a swap; the right to license QDOS (now renamed 86-DOS) in exchange for the right to adapt Microsoft's languages, Result: When the IBM emissaries at the August 28 meeting asked about 16bit operating systems, Bill Gates thought he might just be able to find one

Over the next few weeks the Microsoft consultants forcefully expressed their opinions of what the IBM machine ought to be. Nishi grandly pushed for more memory. more colors, more keys, Gates plumped for a 16-bit version of the Oki machine. As one IBM insider remembered it, "Every time I talked to Bill, he gave me the impression I was his most important customer. He even gave us free advice."

In Bill's view, 48K machines were underpowered, so a 16K system was silly. At a time when disk drives had virtually become standards, making them mere options was ridiculous. The built-in cassette port was utterly ludicrous.

But to IBM's marketeers, the compromises were essential so that a stripped-down machine could be offered at an attractive price. "I'm putting in fifty cents' worth of parts for the cassette port," Eggebrecht told Bill. "You put in fifty cents' worth of software."

Gates and Nishi also fostered changes in the keyboard design and pushed hard for improvements in the machine's graphics. And Gates and Nishi strongly influenced the IBM character set: As fans of the Wang word processor; they fought for and eventually won an array of odd arrows and other oddball characters with low ASCII values—which still exist today. Their scheme was to do a software clone of the Wang for the IBM machine—an early Gatesian le-veraging of hardware to further his software desired.

The operating system could not be ignored much longer. By the end of September Microsoft would have to deliver a proposal in Boca. Frustrated by Digital Research's inability to come up with dates or terms or secrecy agreements, Sams recomposed in the control of the control of

Microsoft had its Smart Guys, maverick programmers who churned out code in crazed frenzies like digital Mozarts and Kerouacs, who worked hard and drove fast and had the kind of rocket-sled no-limits mentality that Gates loved to see.

mended that Bill include in his proposal the 16-bit operating system he had mentioned.

At a late-night powwow Sunday, September 21, Allen, Gates, Ballmer, and Nishi looked at the angles. The company was insanely busy, overcommitted, bursting at the seams. Engineers from Japanese companies slept on mats in the hallways, taking sponge baths in the men's room, wolfing down cases of Cup o' Noodles. Among their machines was a unit code-named Goan-8-bit Matsushita computer that another wing of IBM was considerine as an OEM offering.

For the Boca Raton IBM project, Microsoft was already committing to a tremendous amount of new code on a killer schedule. When you looked at it it that way, tossing in an operating system, particularly one that already seemed sound and would be developed mostly elsewhere, didn't seem such a big deal. It was a small increment over the rest of the code. It offered control and independence. Uffered control and independence. UfBy all accounts it was Kay Nishi who danced around and sounded the battle cry: "Gotta do it! Gotta do it!"

Paul Ålen phoned Rod Brock in the morning. A customer was interested in sublicensing 86-DOS, Allen said, but secrecy agreements prevented him from saying who. Brock and Allen reached a verbal agreement the next day. For an upfront fee of \$10,000, Microsoft would have the nonexclusive right to distribute \$8-DOS to end users. For an additional fee of \$10,000 per company, or \$15,000 if source code was included, Microsoft could sublicense 86-DOS to OEM customers. Scattle Computer agreed to revise the product

on a crash schedule.

Negotiated by Allen, the deal was a masterstroke that even Bill Gates could be proud of. Microsoft

Microsoft hadn't signed anything; if for some reason IBM backed out at the Boca meeting, Gates could likely wriggle free without spending a cent.

The evening of September 29, programmer Bob O'Rear ripped the final proposal from the Wang word processor, jumped into Bill's Porsche, and closed his eyes. It was time for a patented Gatesian high-speed can-we-make-it race to the airport to meet Steve Ballmer and the red-eye to Florida.

Next morning in Miami, the trio changed into their sixts and discovered that Bill had forgotten to pack a tie. They were already going to be late; the tie would make them even later. Still, this was IBM, and IBM meant dress codes. The trio stopped at a mall, waited for Burdine's to open, and grabbed a neckpiece for the president.

To IBM software engineer Ed Kiser, sitting in on the all-day session, Microsoft's chairman came through the door looking like a "kid that had chased somebody around the block and stolen a suit off him

and the suit was way too big for him. His collar stuck up and he looked like some punk lidt, and I said, 'Who the hell is this?'" Kiser was a tough nut to crack: A user of Microsoft's TRS-80 assembler, he had firsthand experience with Bill's commitment to quality. 'If you ever try to sell IBM that piece of crap you call a linker,' he told Gates, "it will be over my dead body."

But even before the meeting, Bill Gates had been in the mind of Philip D. 'Don' 'Estridge, an easygoing but decisive maverick IBM engineer who were cowboy boots around the office, reminded people of Fred Mac-Murray, and had just taken over the reins of what was now known officially within IBM as Project Chess. As Estridge explained over lunch, Bill had support from a higher authority.

Days earlier, Estridge had mentioned something to IBM's president, John Opel, about a little software company named Microsoft. 'Oh, that's run by Bill Gates, Mary Gates's son," Opel had replied. He knew Bill's mom from the national board of the United Way.

Estridge smiled at Bill. "You take your bluebirds where you can get them, I guess."

The Microsoft contingent flew back to Seattle with no deal, no commitment. But negotiations began almost at once with an IBM attorney and a fast-talking Philadelphian named Sandy Meade, who had replaced Sams as the head of the IBM software effort.

In Boea, Gates and Ballmer had told IBM that the initial flat-fee price quote no longer applied. Because IBM wanted the rights to use the code on a variety of future machine, it would have to pay more and pay royalties. Meade was taken aback at Microsoft's bloldness. Other software companies he'd dealt with had been pushovers. With Microsoft, he recalled, "I never felt that they needed the money."

Microsoft received an advance of roughly \$100,000 against a royalty of about \$50 per copy for each of four

HOW TO SPEAK MICROSOFT

If imitation is the sincerest form of flattery, Bill Gates should be pleased that his emplayees have adopted his style of speech. From Manes and Andrews' Gates, we've compiled a list of terms that reflect the Microsoft culture and are part of the vocabulary in Redmand.

Bandwidth: Term borrowed from radio technology; used by Microsoft high/IQ Smart Guys to measure a preson's delibity to absorb more than one piece of information at a time. Most Microsoft stars are high bandwidth, and Gates, of course, is the highest bandwidth of all. Also used to describe the intellectual rapport between two people, as in "the bandwidth between us was termendus."

Bradie: Measure of the difference between the current Microsoft stock price and the price the day Word programmer Richard Bradie left the company. An unsubtle reference to Bradie's rumored decision to sell off early.



Dozings Middle-Offenight spot of Gates and company in Alboyateya. New Mexico, during the summer of 1977. Having discovered that the keys were being left in bulldozers at a construction site, the guys took to letting off seam by playing around with the machines in the wee hours. Gates nearly crushed his Porsche before he mastered reverse.

FYIFV: The smug and partially unprintable message on a button worn by newly rich Microsoft employees after the company went public. The last three letters stand for "I'm Fully Vested."

Hardcore: The Intense work mode common at Micrasaft, characterized by the total neglect of all aspect of one's life outside of Microsoft, Could have described Gates's habitual "seven-hour turnaround," in which he returned to the office within seven hours at leaving for the evening—ar early marring.

Lettuce picker: A Microsoft term for an employee who leaves the company and then returns. It was first used to refer to a stressed on programmer who deported to wark as a farm worker in California but came back after a few weeks, deciding technology wasn't so bad after all.

Microslime (v): Current industry term used by companies that feel they are victims of what they view as Microsoff's predatory and borderline-unethical campetitive practices. As in "we've been Microslimed."



Microsoft Syndrome: Process whereby bright, enthusiastic new hires burn aut after months or years of being given too much work and too little time to do it in

Reality distortion field: First associated with Applie Steve jobs in reference to his talent for persuading people who should have known better of the viability of his grand ideas, At Microsoft, Bill Gates may have fallen victim to his own reality distortion field when he promoted Windows based only an a skeletal demo version of the program.

Smoke and mirrors demo: Unfortunate software industry practice of throwing logether some product code based on a vague idea and presenting the demo with much fanfare but few details and an extremely improbable release schedule. The term was first used at Microsoft following its littlial Uniforws demonstration.

Softer software: A favorite early-Cates expression. Refers to programs that would interpret the user's actions and adjust themselves accordingly, à la artificial intelligence. Since Gates first used the phrase in 1984, there has been little evidence al'softer in Microsoft's products—with the passible exception of an automatic envelope addressor in Wood for Windows 2.0.



Vaporware: Common industry term, first cained by a Microsaft employee, for a product that has been announced and will ship "real soon naw." Manes and Andrews refer to Gates as the Viscaunt of Vapor.

—the editars of PC/Computing

language compilers—Pascal, CO-BOL, FORTAN, BASIC. It received roughly \$200,000 for all its "adaptation" work to get everything to run on the IBM system. And it got a combined advance of roughly \$400,000 for DOS and interprated BASIC, against a royalty of \$1 for \$10 or \$15, depending on the source) for each copy of DOS and/or that BASIC.

But the royalty was irrelevant. Under the terms of the agreement, as long as BASIC remained in ROM

For Gates, IBM was the ultimate client, the coolest deal a little software company could dream of making.

on the initial machine and its descendants (thereby making Microsoft BASIC the undisputed IBM standard), no royalty would be due for DS. With BASIC—in ROM, there might be payments for enhancements and fixes to DOS and BASIC, but that would be all. To this day, every IBM Personal Computer has the original BASIC—intended primarily for use with a casester recorder that is no longer even an option—stored in a ROM chip within the machine.

There was another wrinkle. IBM could in theory sell copies of the programs to third parties; what it could not do was "publish or disseminate the SOURCE CODE for a period of seven (7) years from the effective date of this Agreement." IBM's liability for violating this clause was theoretically unlimited. In essence, IBM could not license Microsoft's programs to third parties. But since the contract was nonexclusive, Microsoft could—and would.

Meade vividly remembered Bill's unorthodox way of contemplating contract terms. "Gates went into his office at ten-thirty at night, lay down on the floor, and was tossing and turning, moaning 'Should I do this? I don't know. It's a good relationship, I don't know.

The final papers were brought to Seattle by Ed Kiser and another IBM programmer. Microsoft still didn't have a formal agreement with Seattle Computer to license the DOS it was now peddling to IBM, but that didn't seem to bother Gates. On the day the contract was signed, November 6, 1980, Steve Ballmer was wearing a suit, Not Bill: Sporting a sweatshirt with the emphasis on sweat, he looked as if he needed a shave.

Gates did much of the negotiating from a reclining position on his office sofa. When the papers were

When the papers were finally complete, he got up, borrowed a pen from Kiser, and signed the contract. In his sole concession to IBM awe, he affixed the accurate ner" beneath his name

title "Partner" beneath his name rather than his usual inflated "President."

Handing back the pen, Gates looked at Ballmer and said, "Well, Steve, now we can get to work."

It was just two days after Ronald Reagan had trounced Jimmy Carter in the presidential election, ushering in a new era of national conservatism. The deal with IBM was about to usher in a new era of its own. "I felt there should have been a fanfare of trumpets, or at least a gong," Kiser said. "But we just gathered up the papers, shook hands, and walked out the door."

UTSIDE OF maintaining the IBM relationship, Bill Gates's main involvement with the "Chess" machine was with his first love, BASIC—refining the spees, coding and reviewing, teaching young Neil Konzen the "right" way to put the IBM logo on the screen, getting pissed off when a self-described "random little grit" like Konzen came up with a better algorithm.

Gates and Konzen were responsible for one of the oddest programs IBM ever released: DONKEY, a game in which the player's car tries to avoid hitting the eponymous animals—one of the few real-life driving experiences Bill Gates seems to have

missed. "Sunday afternoon it was the two of us in that sweaty room," Konzen recalled. "I drew the thing. It was supposed to be a cow, and it was a feeble little cow, and we figured, 'Okay, it's a donkey,' "Avoiding the beast was no thrill; hitting it, however, blew a ruspberry from the speaker and displayed the message "BOOM! Donkey loses!"

The general weirdness of the program was not lost on the IBM wild ducks, who threw it on the DOS disk anyway. IBM wasn't all that particular about what it sent out to its entry-level customers. With DOS, it would also tose in a rudimentary text editor called EDLIN, written by Tim Paterson back in the Quick and Dirty days and initially unintended for public consumption. It would survive for more than ten years.

N MAY 1981, after a falling-out with Rod Brock, Paterson strolled through the door as an employee of Microsoft, Pascal wizard Bob Wallace greeted him at the reception desk, had him sign the standard nondisclosure agreement, and ushered him down the hall to a hot little closet. It was there that Paterson got his first glimpse of the machine whose operating system he had been fine-tuning for months and was now virtually completeright down to the IBM-requested change back from his A: prompt to CP/M's A>. Indeed, much of IBM's DOS technical documentation had been lifted directly from Paterson's 86-DOS manuals for Seattle Computer.

At IBM, marketing considerations became dominant. One faction wanted to call the machine "Freedom," but the name that stuck was classically simple: the IBM Personal Computer. It would be the first IBM computer marketed without a number, although it had one—5150—discreetly on the back.

By midyear, Electronics magazine intimated that the machine's operating system "is similar to CP/M and will be called IBM Personal Computer DOS." The report was on

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target: Although the IBM Personal Computer Disk Operating System would soon become known familiarly as PC-DOS, neither Microsoft nor IBM ever trademarked or officially used the term.

Though CP/M-86 was still late. Gary Kildall was not about to concede defeat. Having gotten wind of Microsoft's DOS deal, he and attornev Gerry Davis were pointing out to IBM's legal department and Don Estridge and anyone else who might listen that there were suspicious similarities between DOS and CP/M. The hint of court action, something that might cast a pall over the product rollout, caught the attention of the litigation-shy IBM. When the Digital Research crew met with Estridge, he confronted them pointblank. What did they really want?

Kildall said he wanted CP/M-86 to be offered on the IBM machine. In

IBM wasn't all that particular about what it sent out to entry-level customers. With DOS, it would toss in a rudimentary editor called EDUN initially unitended for public consumption. It would last for ten years.

exchange for an agreement to drop any thought of injunctive relief, Estridge struck the deal. Bill Gates would shortly find himself sharing the IBM machine with a competitor he thought had disappeared. He would later charge that IBM was "blackmailed into it."

It was time to take off the gloves. On June 25, in a letter to Rod Brock, Paul Allen proposed that Microsoft buy all rights to 85-DOS for 830,000. Microsoft would support and revise the product, and SCP would green whatever enhancements Microsoft might make, free of charge. As Allen wrote, "You would be releived [sel] of the support of SCP DOS and have extra cash to potentially expand your hardware efforts, while we would be able to try to take CP/M-86 to the mat."

On July 10, Brock countered. Noting interest in the software from another vendor, Brock offered 86-DOS at a price of \$150,000, plus the right to license Microsoft languages at a discount.

As Ballmer remembered it, "the \$150,000 number we all agreed was just this mighty grab for gold." The figure would, in typical Gatesian exaggeration, "bankrupt the company"—this from the same Bill Gates who reportedly made \$1 million and paid \$500,000 in federal income tax that very vear.

Allen thought Brock might take \$50,000. Gates insisted that the deal be an outright purchase, not a mere license, Years before, Microsoft BA-SIC had provided bitter experience in what could happen when a license didn't work out.

Gates knew the deal had to be done fast. By now Brock was sure to have guessed who the unnamed customer was. Still. Brock hadn't vet

seen the IBM machine and couldn't possibly guess its potential importance. Ballmer rushed the deal through, personally delivering the papers to Seattle Computer's offices.

The final agreement, signed on July 27, sold 86-DOS outright to Mi-crosoft for an additional \$50,000. In return, Seattle Computer got a royaty-free DOS lienes for "purchasers of hardware manufactured by Sellen." Seattle Computer would also get DOS "updates and enhancements" and deep-discount licenses to Microsoft's Innurages.

Brock saw it as reasonable. He was in the hardware business, and now he could give his operating system away. Although Paterson, still a shareholder and director of Seattle Computer, knew what was going on with IBM, his nondisclosure agreement as a Microsoft employee kept him from telling Brock. He read the contract and "thought it was a fair deal."

It wasn't just a fair deal for Microsoft. It was the deal of the century. For a grand total of \$75,000\$25,000 on the first agreement, \$50,000 on the second—the company now owned DOS lock, stock, and barrel—or thought it did. Bill Gates would go on to make DOS the foundation of his empire. But he had not heard the last from Rad Brock.

HE FORCE that was really going to drive Microsoft to the top was the Smart Guys. IBM had its wild ducks, Apple had its Pirates, and Microsoft had its Smart Guys, mayerick programmers who took gas from no one, who churned out code in crazed frenzies like digital Mozarts and Kerouacs. who worked hard and drove fast and had the kind of rocket-sled no-limits mentality that Gates and Ballmer loved to see. So dominant would their impact he that whenever Bill Gates was asked the secret to his company's success, he would unhesitatingly answer with a variant of the phrase, "We hire smart guys," The smartest? By general consensus. Gates, secure enough to hire egos even bigger than his own,

Witness the transformation! At the end of 1979. Microsoft had been a partnership with twenty-eight emplovees and sales of roughly \$2.4 million. It had offered a variety of programming languages, mostly for OEM customers, and a tiny assortment of lowball packages for end users. Just two years later Microsoft was a corporation with venture capital funding, sales of \$16 million, 130 employees, over \$1 million in the bank, and the broadest product line in the microcomputer software business: languages, operating systems, application programs, even hardware. The IBM deal and MS-DOS had completed Microsoft's transformation from a little language house to a "one-stop shopping" center. And Bill Gates was publicly predicting the company would reach \$100 million in sales within five years.

To be continued next month when we look at the true story behind the development of Windows.

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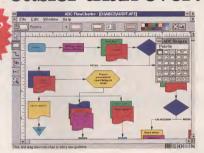
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How Computers Work

A Detailed Look at What's Going on Inside Your PC and Peripherals

By Ron White and Timothy Edward Downs

HOW IT WORKS DEBUTED IN *PC/Computing* IN 1989 AS PART OF A NEW section of the magazine called Help. Its combination of lavish illustration and straightforward text has embodied what we feel is *Pc/Computing*'s unique accomplishment: the ability to make highly technical information accessible to all computer users.

From the magazine, How It Works has been developed into a book, How Computers Work, published by Ziff-Davis Press and written by PC/Computing executive editor Ron White, who launched the series. Now it comes full circle, from the book back to the magazine, in this collection of highlights from the Ziff-Davis Press edition. The book is more than a compilation of reprints of the original articles:

Each feature has been revised to give more detailed explanations and to correct the, ahem, occasional error. And PC/Computing designer Timothy Edward Downs has created a new illustration for each topic.

Many writers and editors have contributed to How It Works over the years, and we are grateful to them all for helping make it one of the most popular features in PC/Computing. We hope you enjoy this panoramic look at the most important parts of the machine you use, cherish, and curse every day.

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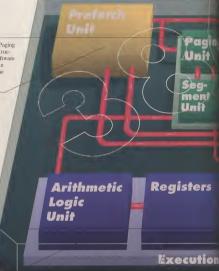


Microprocessor

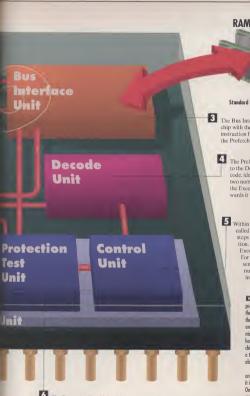
- At the same time, the Segment and Paging units convert the location of that instruction from a virtual address, which software understands, to a physical address (an actual location in memory), which the Bus Interface Unit understands.
- The Prefetch Unit, which queues instructions for processing, asks the Bus Interface Unit to retrieve from memory the next instruction—in our example, a command to add two numbers. The goal of the Prefetch Unit is to make sure that when the instruction Decided Unit work in the control of the processing of the prefetch of the processing of the processing

9 The Control Unit tells the Bus Interface Unit to store the sum in RAM. The Segment and Paging unis translate the virtual address specified by the Control Unit for that sum into a physical address, completing the instruction.

8 The Arithmetic Logic Unit, which is the microprocessor's calculator, produces the sum of the number that was just retrieved from RAM and the first number that had been stored in the internal registers.



The Bus Interface Unit locates and retrieves the number stored at that address. The number travels back through the Protection Test Unit to the Execution Unit, where it is stored in one of the chip's internal registers. The registers function as a combination scratch pad and working memory for the Execution Unit. A similar operation results in the second number also being fetched to the Execution Unit.



The Protection Test Unit, which acts as a traffic cop for the Execution Unit, makes sure that the operations performed by the Execution Unit are legal—that they don't modify locations in memory or access peripherals that they obtained in this case, the Protection Test Unit verifies that the Control Unit can access the address of the first number and forwards it to the Segment and Paging units, where the virtual address is translated into a physical address for use by the Bus Interface Unit.

Standard SIMM Chips

The Bus Interface Unit, which links the 386 chip with the rest of the PC, retrieves the instruction from RAM and passes it along to the Prefetch Unit.

The Prefetch Unit forwards the instruction to the Decode Unit, which examines the code, identifies it as an instruction to add two numbers, translates it into a format that the Execution Unit can understand, and forwards it to the Execution Unit.

5 Within the Execution Unit, a subunit called the Control Unit coordinates the steps necessary to complete each instruction. It tells the other parts of the Execution Unit what to do and when. For this operation, the Control Unit sends a virtual address of the first number to be added, which is stored in RAM, to the Protection Test Unit.

EIDSTI here or several types of 90386 mirror processor. Most or defininguished by the speed of which they run, usually expressed in negothertz. The higher the negothertz makes, the foster the processor. There or or obe DX and SX versions of the 386. The DX communicies with RAM over point their SZ bit which. The SX hondles dobe internally, 32 bits or a time, just os the DX think does, but it communicates with RAM only 16 bits or or time. The SX is easier and chappe to incorporate into other YC designs, which is it only obstantials.

Since the 386 were released, Intel Buck offer created an 0.0466. It is no manipulated solds 2.38 for a of time, but it includes two components that the 80386 does not. One is a built in 80 KMA code that works similarly to an external RMA code the easure flot HM code the easure flot HM code in center flot HM code to easure flot HM code in forced to write for the data in needs to do its work. The other components is built-in mark opporators. The coprocessor is a set of instructions streamlened for bandling complex most part of the components of the set of t

VGA Desktop Monitor The adapter also sends signals to a mechanism in the neck of the CRT that focuses and aims the electron beams. 3 The adapter sends signals to three Part of the mechanism, a magnetic electron guns located at the back of deflection voke, uses electromagnetic the monitor's cathode-ray tube fields to bend the path of the electron 2 The DAC circuits compare (CRT). Each electron gun shoots out streams. The signals sent to the voke the digital values sent by the a stream of electrons, one stream for help determine the monitor's PC to a look-up table that each of the three primary colors. The resolution- the number of pixels horicontains the matching voltintensity of each stream is controlled zontally and vertically- and the age levels for the three by the signals from the adapter. monitor's refresh rate, which is how freprimary colors needed to crequently the screen's image is redrawn. ate the color of a single pixel. The table contains values for 262,144 possible colors, of which 256 values can be stored in the VGA adapter's memory. (Super VGA displays, which have more memory, can handle more colors and, for higher resolution, more pixels.) VOLTAGES Digital signals from the operating environment or application software are 21111111111 received by the VGA adapter (sometimes built into the PC's motherboard). The adapter runs the signals through a circuit called a digital-to-analog converter (DAC). Usually the DAC circuit is contained within one specialized chip, which actually contains three DACsone for each of the primary colors used in a display: red, blue, and green.

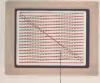


The electrons strike the phosphors coating the inside of the screen. (Phosphors are materials that glow when they are struck by electrons.) There different phosphor materials are used—one each for red, blue, and green. The stronger the electron beam that his a phosphor, the more light the phosphor emits. If each red, green, and blue dot in an arrangement is struck by equally intense electron beams, the result is a dot of white light. To create different colors, the intensity of each of the three beams is varied. After a beam leaves a phosphor dot, the phosphor continues to glow briefly, a condition called persistence. For an image to remain stable, the phosphors must be reactivated by repeated seans of the electron beams.

After the beams make one horizontal sweep across the screen, the electron streams are turned off as the electron guns refocus the paths of the beams back to the left edge of the screen at a point just below the previous scan line. The process is called rater seaming.



The magnetic deflection yoke continually changes the angles at which the electron beams are bent so that they sweep across the entire screen surface from the upper-left corner of the screen to the lower-right corner. A complete sweep of the screen is called a field. Upon completing a field, the beams return to the upper-left corner to begin a new field. The screen is normally returns the upper-left corner to begin a new field. The screen is normally returns, or perforshed about 61 times a second



Some display adapters scan only every other line with each field, a process called *thierlacing*. Interlacing allows the adapter to create higher resolutions—that is, to scan more lines—with less expensive components. But the fading of the phosphors between each pass can be more noticeable, causing the screen to flicker.

Hard-Disk Drive

A spindle connected to an electrical motor spins as many as eight magnetically coated platters at several thousand rotations per minute. The number of platters and the composition of the magnetic material coating them 2 On the bottom of the drive, a printed circuit board, also known determine the capacity of the drive. Today's platas a logic board, receives commands from the drive's controller. ters, typically, are coated with an alloy about 3 which in turn is controlled by the operating system. The logic millionths of an inch thick. board translates those commands into voltage fluctuations that force the head actuator to move the read/write heads across the platters' surfaces. The board also makes sure that the spindle turning the platters is revolving at a constant speed, and the board tells the drive heads when to read and when to write to the disk. On an IDE (Integrated Drive Electronics) disk, the disk controller is part of the logic board. A sealed metal housing protects the internal components from dust particles that could block the narrow gap between the read/write heads and the platters and cause the drive to crash by plowing a furrow in a platter's magnetic coating. 286





Stacker works with portables and laptops, which is one of the few ways to increase their capacity.



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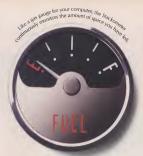
Normally, Stacker gives you a compression ratio of about 2:1. With the default setting, you can get maximum speed. But by simply tuning the settings, you can increase disk capacity by up to 10%. So on a 200 meg drive, that means an extra 40 mees of suace.

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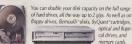
On all stacked drives, you can set double passwords, one for read/write and one for read-only access. With read/write, users who don't know your password have no access to your data. With read-only, they can see the data but are unable to alter it.



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In addition to your available space, the Stackometer also shows you your compression ratios and fragmentation levels for all of your drives.



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If you use our Express Setup, just insert the disk and press return a few times and you're done. With the Custom Setup, you can adjust Stacker to fit your exact needs.



In explaining what our new software does we ran out of space.



CD-ROM Drive

- Each pulse of light that strikes the light-sensing diode generates a small electrical voltage. These voltages are matched against a timing circuit to generate a stream of 1s and 0s that the computer can understand.
- Eight that strikes a pit is scattered, but light that strikes a land is reflected directly back at the detector, where it passes through a prism that deflects the reflected laser beam to a light-sensing diode.

The surface of the reflective layer alternates between lands and pits. Lands are flat surface areas; pits are tiny bumps on the reflective layer. These two surfaces are a record of the 1s and 0s used to store data.

Land

The laser beam penetrates a protective layer of plastic and strikes a reflective layer that looks like aluminum foil on the bottom of the disk.

Prism

Disk

Light-sensing diods

— Laser diode

Focusina

Objective



Modem

Your communications software sends a voltage along pin 20 of the serial port to which the modem is connected. The voltage is called a Data Terminal Ready signal, or simply, a DTR signal. It tells the modem than the PC is turned on and ready to transmit data. At the same time, the PC detects a voltage from the modem on pin 6—Data Set Ready, or DSR signal—that lets the PC know the modem is ready to receive data or instructions fin a normal modem connection, both signals must be present before anything else can happen.



2 Using a standard command language named after the Hayes modems on which it was first popularized, the communications software sends a command to the modern via line 2, the Transmit Data line. The command tells your modern to go off hook—to open a connection with the phone line. The software follows with another Hayes command that tells the modern to issue the tones of the properties of the command by replying to the PC on line 3, the Mercine Data the Confine Control of the Steries Data the Command by replying to the PC on line 3, the

When the modem on the other end of the phone connection—the remote modem—answers the call, your local modem sends out a hailing tone to let the remote modem know that it's being called by another modem. The remote modem responds with a higher-pitched tone. (You can ordinarily hear the two tones if your modem is equipped with a speaker.)

When communications are established, your modem sends your PC a Carrier Detect (CD) signal on line 8. The signal tells the communications software that the modem is receiving a carrier signal, which is a steady tone of a certain frequency and which later will be modulated to transmit data.



The two modems exchange information about how they'll send data to each other, a process called a handshake. The two modems must agree on the transfer speed, the number of bits that make up a dan packet—for example, a single character—how many bits will signal the beginning and end of a packet, whether the modems will use a parity bit for error checking, and whether they will operate at half-dauplee or full duplex. If the local and remote systems do not use the same settings, either they!ll wind up sending characters that make no sense or they'll refuse to communicate at all. [Continued on page 294.]



Transitistin Speed. Although transmission speeds are often expressed in hund—the number of frequency changes occurring during on escond—that term is outdated and his per second is more accurate today. The transmission rate on early moderns of 300 bits per second was achieved by sending one frequency to indicate a 0 bit and a different frequency to indicate a 1 bit. The analog signal of a phone line is limited in how quickly it can switch frequencies, which has recessitated different schemes to increase the rate at which data is sent.

Group coding permits different frequencies to stand for more than one bit at a time. For 1.200 hit persecond transmissions, for example, signals are actually sent at 600 band, but three different frequencies are used to represent the three different possible pairs of binary bits 0 and 0, 0 and 1, and 1 and 1. A similar scheme matches more frequencies with more binary combinations to achieve 2,400 bits per second. For still faster transmission rates, the two modems must both use the same method of compressing data by recopining frequently repeated partners of 0s and 1 san dusing shorter codes to stand for those patterns.

Data Bits Communications systems may use either seven bits or eight bits to represent a data packet. In this example, eight data bits are used.



Perify Bi: As a form of error correction, the two systems may agree to use even parity, odd parity, or no parity at all. If they agree on even or odd parity, both systems add up the bits contained in the character and then add another bit called the parity bit. It may be either a 0 bit or a 1 bit, whichever is needed, to make the total citer an even number or an odd number, depending on the parity that the systems agree on.

Hulf-/Full Duplox. The two systems must agree which is responsible for displaying text on the local computer. One system must be set for full duplex and the other set for half-duplex. The system using full duplex is responsible for display text on both systems and echoes any text sent to it by the half-duplex system. If the two systems don't use complementary duplex settings, either no text will appear on the local system or each character will appear twice.

Modem 6 When the communications software wants to send data, it first sends voltage to line 4 on the serial port. This Request to Send (RTS) signal, in effect, asks if the modem is free to receive data from your PC. If the modem is receiving remote data it wants to pass on to your PC while your PC is busy doing something else, such as saving earlier data to disk, the PC will suspend the RTS signal to tell the modem to stop sending it data until the PC finishes its other work and reasserts the RTS signal. 7 Unless your modern is too busy handling other data to receive new data from your system, it returns a Clear to Send (CTS) signal to your PC on serial port line 5, and your PC responds by sending the data to be transmitted on line 2. The modern sends data it received from the remote system to your PC via line 3. If the modern cannot transmit the data as fast as your PC sends data to it, the modern will drop the CTS When you tell your communications signal to tell your PC to hold off on any further data until the modem software to end a communications catches up and renews the signal. session, the software sends another Haves command to the modern that 8 At the other end of the phone line, the remote causes it to break the phone connecmodem hears incoming data as a series of tones tion. If the connection is broken by with different frequencies. It demodulates the remote system, your modem these tones back into digital signals and will drop the sends them to the receiving computer. Carrier Detect Actually, both computers can send signal to your signals back and forth at the PC to tell the same time because the use of software that a standard system of tones communicaallows modems on tions are either end to distinbroken. guish between incoming and out-

going signals.

Reading Your Modem Lights

The indicator lights on the front of an external modem tell you what's happening during your communications session. The exact locations of the lights and the order in which they appear vary from modem to modem. But they are usually labeled with two-character abbreviations. Here's what they mean.

The High Speed light indicates that your modem is currently operating at its highest available transmission rate. The Auto Answer light indicates that your modern will automatically answer any incoming calls. This feature allows access to your system while it's unattended. The Carrier Detect light goes on whenever your modern detects a carrier signal, which means it has successfully made a connection with a remote computer. The light should go out only when one of the computers hangs up its line and the carrier signal is dropped. OH The Off-Hook light goes on whenever your modern takes control of the phone line. This is equivalent to taking your telephone receiver off the hook. RD The Receive Data light flickers each time the modem transfers data to your computer. This happens whenever you're receiving data from the remote computer. The Send Data light flashes each time your computer transfers data to the modem, whenever you're sending data to the remote computer. TR The Terminal Ready light goes on when the MR The Modem Ready modem detects a DTR (Data Terminal light lets you know Ready) signal from your communications softthat your modem is ware. This signal informs your modem that a turned on and ready to communications program is loaded and ready operate.

to run.



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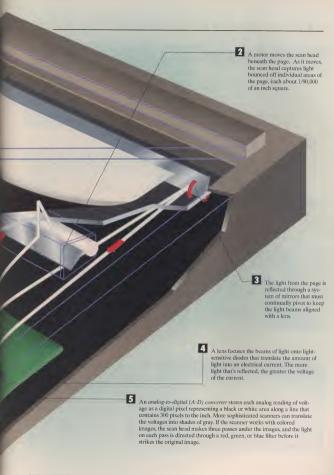
Circle 113 on reader service card.

Title page from OmniPage, OmniPage Perfocianal, OmniPage Direct, Wordson, Wordson Plus, Readilight, Readilicht, Re

Flatbed Scanner

A light source illuminates a piece of paper placed face down against a glass window above the scanning mechanism. Blank or white spaces reflect more light than do inked or colored letters or images.

The digital information is sent to software in the PC, where the data is stored in a format with which a graphics program or an optical character-recognition program can work.



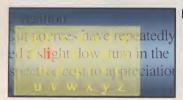
Optical Character Recognition



When a scanner reads-in the image of a document, the scanner converts the dark elements
—text and graphics—on the page to a binnap,
which is a matrix of square pixels that are either
on (black) or off (white). Because the pixels
are larger than the details of most text, this
process degenerates the sharp edges of characters, much as a fax machine blurs the sharpness
of characters. This degradation creates most of
the problems for optical character-recognition
(OCR) systems.



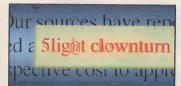
The OCR software reads-in the bitmap created by the scanner and averages out the zones of on and off pixels on the page, in effect, mapping the white space on the page. This enables the software to block off paragraphs, columns, leadlines, and random graphics. The white space between lines of text within a block defines each line's baseline, an essential detail for recognizing the characters in the text.



In its first pass at converting images to text, the software tries to match each character through a pixel-by-pixel comparison to character templates that the program holds in memory. Templates include complete fonts—numbers, punctuation, and extended characters—of such common faces as 12-point Courier and the IBM Selectric typewriter set. Since this technique demands a very close match, the character attributes, such as hold and taile, must be identical to qualify as a match. Poor-quality scans can essily try pip matrix matching.



The characters that remain unrecognized go through a more intensive and time-consuming process called feature exeraction. The software calculates the text's x-height—the height of a font's lowercase x—and analyzes each character's combination of straight lines, curves, and bowls (hollow areas within loops, as in o or b). The OCR programs know, for example, that a character with a curved descender below that a character with a curved descender below the second of the constraint of the constrain



Because these two processes don't decipher every character, OCR programs take two approaches to the remaining hieroglyphics. Some OCR programs tag unrecognized characters with a distinctive character—such as - #, or @—and quit. You must use the search capability of a word processor to find where the distinctive character has been inserted and correct the word manually. Some OCR programs may also display a magnified bitmap on screen and ask you to press the key of the character needed to substitute for the placeholder character.



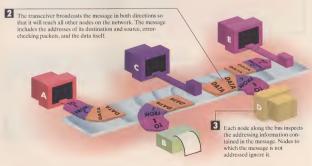
Still other OCR programs invoke a specialized spelling checker to search for obvious errors and locate possible alternatives for words that contain tagged unrecognized characters. For example, to OCR programs, the number 1 and the letter flook very similar, so do 5 and 5, or cl and d. A word such as downturn may be rendered as clownturn as possible contained to the program of th

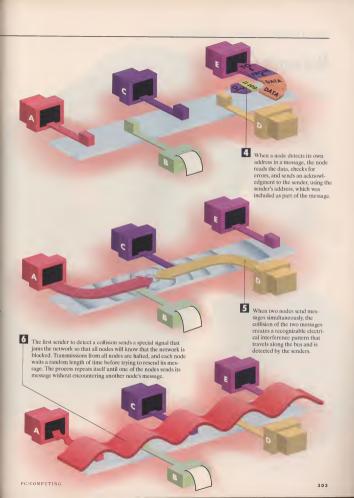


Most OCR programs give you the option of saving the converted document to an ASCII file or in a file format recognized by popular word processors or spreadsheets.

Bus Network

All nodes on a bus network are attached to the LAN as branches off a common line. Each node has a unique address. The network eard installed in a node, which can be another PC, a file server, or printer server, listens to make sure that no other signals are being transmitted along the network. It then sends a message to another dvice by giving it to a transcriver. Each node has its own transcriver.





Network Communications

- The application layer is the only part of the communications process that a user sees, and even then, the user doesn't see most of the work that the application does to prepare a message for sending over a network. The layer coveres a message shaft from human-readable form into bits and attaches a header identifying the sending and receiving computers.
- The presentation layer ensures that the message is transmitted in a lin-guige that the receiving computer can interpret (often ASCI). This layer translates the language, if necessary, and then compresses and perhaps encrypts the data. It adds another hadder specifying the language as well as the compression and encryption schemes.
- The session layer opens communications and has the job of keeping straight the communications among all nodes on the network. It sets boundaries (called bracketing) for the beginning and end of the message, and establishes whether the message will be sent halfdupter, with each computer taking turns sending and receiving, or full duplet, with both computers sending and receiving at the same time. The details of these decisions are placed into a session header.
- The transport layer protects the data being sent, it subdivides the data into segments, creates checksum tests—mathematical sums based on the contents of data—that can be used later to determine if the data was scrambled. It can also make backup copies of the data. The transport header identifies each segment's checksum and its position in the message.
- The network layer selects a route for the message. It forms data into packets, counts them, and adds a header containing the sequence of packets and the address of the receiving computer.
- The data-link layer supervises the transmission. It confirms the checksum, then addresses and duplicates the packets. This layer keeps a copy of each packet until it receives confirmation from the next point along the route that the packet has arrived undamaged.

The physical layer encodes the packets into the medium that will carry them—such as an analog signal, if the message is going across a telephone line—and sends the packets along that medium.

Header

Header

Header



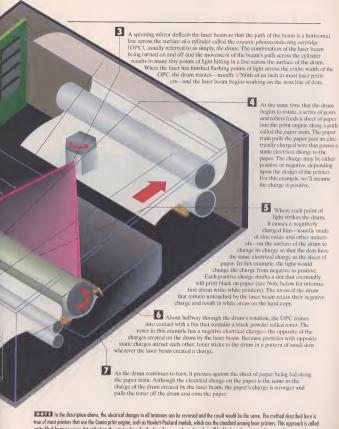
Laser Printer



Your PC's operating system or software sends signals to the laser printer to determine where each dot of printing toner is to be placed on the paner. The signals are one

of two types—either a simple ASCII code or a page description language command. The instructions from the printer's processor rapidly turn on and off a beam of light from a laser.

- The paper train pushes the paper out of the printer, usually with the printed side down so that pages end up in the output tray in the correct order.
- Another set of rollers pulls the paper through a part of the print engine called the fusing system. There pressure and heat bind the toner permanently to the paper by melting and pressing a wax that is part of the toner. The heat from the Ginsing system is what causes paper fresh from a laser printer to be warm.
 - The rotation of the drum brings its surface next to a thin wire called the corona wire. It's called that because electricity passing through the wire creates a ring, or corona, around it that has a positive charge. The corona returns the entire surface of the drum to its original negative charge so that another page can be drawn on the drum's surface by the laser beam.



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Color Thermal Printer



The color thermal printer feeds a sheet of specially coated paper from its bin into the print engine, where the paper is held on one side by a roller that presses the paper against a wide ribbon coated with colored inks mixed with wax or plastic. The ribbon contains a band of each of the composite printing colors—quan magenta, yellow and, if it's used, black. Each color band covers a large area—the width and length of the sheet of paper.

As the paper passes through the paper train, it first presses against the eyan band of the ribbon.
One or more heating elements arranged in a row on the thermal print head on the other side of the ribbon are turned on and melt small dots of the eyan dye. The melted dots are pressed against the paper.



The paper continues moving through the paper train until it is partially ejected from the printer. As the paper peels away from the ribbon, the unmelted cyan ink remains on the ribbon and the melted dye sticks to the paper.



The color ribbon turns to expose the magenta band, and the paper is pulled back into the printer, where it presses against the magenta band of the ribbon and the thermal process is repeated. The process repeats itself for all of the colors used by the printer, and then the page is completely ejected.

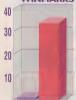


486 STAMPEDE



That thunder you hear on the PC prairie is the New Breed Hyundai 486 stampede. The hardestcharging, price-lean, MIPS-mean herd of computers you'll ever see. We're bringing everything from powerful 68hHz 486DX2 machines to Overdrive-Upgradable 486SX-25 computers. And with our 50MHz 486DX2 desktop PC and 486DX-33 blasters, you can handle today's demanding applications.

WINMARKS



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Do something thunderbolt.

Lightning-fast "warpspeed" L2 caching is another max-performance feature that's designed into every Hyundai 486. Thunderbolt write-

VESA LOCAL BUS GRAPHICS

back operations blast your DOS, Windows, or OS/2 data into a box canyon of ultra-fast SRAM. Start out with 128KB standard (more than the cow computers), then expand to 256KB to handle today's big applications. Cache hit for cache hit, the

Hyundai 486 Family, with 128KB standard caching, delivers twice the MIPS of non-cached cows.

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486SX/33-\$1999

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433S flexes its processing muscle up to 256KB of cache expansion. This system runs at the head of the stampede!

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101 keyboard, 2 button mouse
 8uilt-in virus protection, front keylock,
 2 level password

you'll need for your higher-speed 486 CPU.



Hyundai 433S

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- Product spec tax: 800-723-484
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- 360MB 12ms SCSI HDD, 256KB disk buffi
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- tion, .28 dot pitch, 72MHz refresh rate • Seven 32-bit EISA slots, one ISA slot
- Seven 32-bit EISA slots, one ISA slot
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Hyundai

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- 14" non-interfaced, ultra-high resolution, 2B dot ontch. 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base
- . 25/1P, integrated PS/2 mouse port
- . 5 external drive bays, 2 internal . 7 slots incl. | VESA Local Bus slot
- 200 watt power supply . 101 keyboard, 2-button mouse
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- . NS DOS S.O. and MS Windows 3.1.
- . Other hard drive, video, memory, and monitor options available pitch, 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base



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- * Processor upgradable via ZIF socker 4MB system memory expandable to 64MB on board
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599 Hyundai 450D2

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 12BKB "warpspeed" write-back 20ns SRAM L2 cache (expandable to 256KB)
- Processor upgradable via ZIF socket
 BMB system memory expandable to 64MB onboard
 200MB 12ms IDE HDD, 256KB disk buffer
- 1.44MB 3-1/2" and 1.2MB 5-1/4" FDDs
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- 7 slots incl. I VESA Local Bus slot . 200 watt power supply
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- . MS DOS 5.0 and MS Windows 3.1 . Other hard drive, video, memory, and monitor options available



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- . 66MHz Intel 4B6DX2 w/BKB integrated cache 32-bit VESA Local Bus UVGA graphics w/IMB VRAN
 12BKB "warpspeed" write-back 20ns SRAN L2 cache
- (expandable to 2568B)
- · Processor upgradable via ZIF socket . BMB system memory expandable to 64MB on board
- * 360MB 12ms IDE HDD, 256KB disk buffer
- 1.44MB 3-1/2" and 1.2MB S-1/4" FDDs · 14" non-interlaced, ultra-high resolution, .28 doc
- pitch, 72Hz refresh rate, flicker-free, color display w/1024 x 768 resolution, tilt-and-swivel base * 25/1P, integrated PS/2 mouse port
- . 5 external drive bays, 2 internal
- . 7 slots incl. | YESA Local Bus slot . 200 watt power supply
- * 101 keyboard, 2 button mouse · Built-in virus protection, front key lock, 2 level password
- . MS DOS S.O and MS Windows 3.1
- · Available in floor-standing model with ISA
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NORTON UTILITIES 6.01

For the past ten years, Norton Utilities has been synonymous with data recovery. Now a brand-new version of Central Point's PC Tools challenges Norton's dominance. Is Norton still the champ?

YOUR FINGER SLIPS AND 40MB OF FILES are formatted to never-never land. DOS says "no way" to unformatting, so you rush out to your PC dealer and reach for rescue software, only to hesitate—your hand inches from the shelf. Which should you choose—Norton Utilities from Symantee Corporation or PC Tools from Central Point Software?

Read the boxes, and you'll find that their lifesaving qualities are closely matched. Both revive accidentally erased files and formatted disks, offering more power than DOS 5.0. Both promise to pull data from disks so damaged that DOS can't read them. Both even sport the same retail price of \$179.

Look beyond your immediate problem, and you'll find a similar pairing of features—at least up to a point. Both Norton and PC Tools offer preventive measures to improve your chances of reconstituting data after disaster strikes, duplicaing file-allocation tables and root directories, and rejuvenating disks. They also allow you to explore your system, edit the most minute disk details, and check the performance of your PC. Both increase your system's speed with disk caching and disk optimization. And both promise a wealth of productivity

PC TOOLS 8.0

enhancements, such as file-find and text-find features, and improvements on the DOS interface, helping you manage your files, your hard disk, and your whole PC.

Beyond that minimum, PC Tools promises a wide range of utilities to ease your day-to-day work on your PC—virus detection and elimination, memory maximization, backup, and mundane functions like communications and note-taking. In contrast, Norton sticks to data recovery, leaving auxiliary capabilities to programs such as Norton Desktop for DOS and Norton Desktop for Windows.

Which to choose? We decided to find out, pitting Norton Utilities and PC Tools against each other using a battery of tests. We loaded the latest version of each program—Norton Utilities 6.01 and PC Tools 8.0—and pushed them to their limits and beyond. We erased megabytes of files, formatted over them, and blasted the boot records, partition tables, and file allocation tables (FATs) to oblivion. We checked each byte recovered by each program and timed every step of the action. And we subjected both packages to extensive usability testing by independent users.

The results: Neither program will save you from all disasters, and each has its weaknesses. In most situations, however, either does the job with an equal chance of success. This equality heralds a surprising shift in the power balance. In the past, PC Tools played catch-up with Norton's disaster-recovery features, earning its strong competitive position through its wealth of other enhancements. With Version 8.0, PC Tools gives you more without compromising efficacy. Choosing between

CENTRAL POL CENTRAL POINT The Most Complete Set of Award-

PC/COMPUTING FACE-OFF

Norton Utilities and PC Tools is tougher than ever, but armed with the results of this face-off, you can pick the program that works best overall—and best for you.

FEATURE PRESENTATION

In this corner sits the champion—Norton Utilities, venerated if only for longevity. The longest-surviving utility package, Norton was first released in 1982 and immediately won disciples for being the only tool that could recover erased files. Throughout the past ten years, Norton has given users the power to test, fix, and alter almost any changeable aspect of their PC's disk system. This power earned Norton its reputation as an advanced program that requires users to have an in-depth knowledge of PCs.

Norton's principal challenger, PC Tools, a relative newcomer, was first released in 1985 as a compact program that gave menu control (optionally memory resident) to basic DOS functions. Almost incidentally, it was able to recover lost files. That last feature, combined with its easy-to-understand interface, made PC Tools the first real competition for Norton.

Norton responded with its own menu-control system and a reworked interface that opened its power to anyone with enough savvy to toggle a PC's power switch. Version 6.01 adds a replacement command interpreter for DOS called NDOS and a software disk cache

Central Point could hardly improve on its interface, so the current incarnation of PC Tools packs in not only every utility program you might possibly need (or dream about) but also a number of full-fledged applications. Included in today's chunky PC Tools package are a DOS shell, memory manager, task switcher, zBASEcompatible database, telephone dialer, communications program with full scripting, and remote-control program that works through modems or networks.

"LOOK AND FEEL"

Call it confluent engineering. Both Norton and PC Tools appear to be the product of the same graphic designer, down to the default color scheme—both load up in a near-monochromatic black, blue, and white. Both programs follow the same command system and allow mouse control after you've installed a mouse driver.

Of the two opening screens, Norton's offers the simpler interface. Its left side contains a vertical moving-bar menu that lists the basic features of the program. The right side documents the function of each feature as it is selected and lists available options. At the bottom of the screen is a DOS command prompt, in which the program name that corresponds to the menu selection automatically appears. Press the Enter key, and the desimated program begins. Or type in any of the displayed options for a more specific selection. Once you understand the operation of this prompted command line, using the Norton package becomes second nature.

Norton's DOS shell, NDOS, doesn't integrate the utilities programs but instead acts as an enhancement to DOS, adding more than 200 new functions to those you can type at the DOS command line. NDOS is a command interpreter that replaces COMMAND.COM, much like its sharware version, 4DOS.

PC Tools 8.0 goes further with its front-end control system. Its PC Shell is a complete general-purpose menu-driven DOS interface and a launcher for PC Tools' functions. In addition, you gain full command of important DOS functions by using a mouse or Windows-like keyboard commands. New to Version 8,0 is Macintosh-



NORTON UTILITIES Norton's unassuming screen is very accessible. Select a utility from the moving-bor menu on the left, and its options and switches appear at the right.



PC TOOLS PC Tools offers o File Monoger-like shell with drive icons and scrolloble, resizable windows. It also supports drog-and-drop file monogement.



NORTON UTILITIES Nartan's anline help suggests ways ta imprave disk perfarmance. It's alsa invaluable far translating cryptic DOS errar messages.

like drag and drop: You can drag a filename and drop it on the icon of its associated program to open it. You can also start individual PC Tools functions from the DOS prompt, but the result is a standalone menu-driven program rather than Norton's command-line utilities.



PC TOOLS Although menu cammands are nat cansistent thraughout all PC Taols functions, help is always pasitianed at F1 in the bottom raw of function-key labels.

VERDICT LOOK AND FEEL

PC Tools PC Shell embraces all of DOS rather than just the functions of PC Tools and provides an abundance of controls, this complexity can prove intimidating even in beginner's mode. However, with a little experimentation, its structure becomes readily understandable, and it can serve as a general-purpose DOS shell for users put off by the DOS prompt.

UNERASING A FILE

DOS's UNDELETE just cannot cope with complex unerasing chores. Norton and PC Tools improve on DOS by providing both automatic and manual file uncrassing augmented by menu-controlled systems. They operate from an original distribution floopy, so you can recover a lost file before installing the program—a wise idea because every time you write to disk, you reduce your chances of recovering a lost file. Slide the appointed disk—Norton calls it the Emergency Disk, PC Tools labels it Undelec—into a floopy disk drive and type the appropriate program name, and the program swings into action.

If you've been careful not to write anything to disk since your dastardly deed, Norton can complete the procedure quickly and automatically. Our 24MB fragmented test file was back in under three seconds. If

you've been careless, you face the tedious chore of mamually selecting the individual clusters to add to the restored file. Norton helps by guessing which clusters to add, but because it's not always successful, you must preview each cluster before deciding to add it to the file being unerased. (The gibberish of program data makes their mamul recovery almost hopeless) If part of your file has been overwritten, you can manually unerase the portions that remain on your disk, searching for them using whatever of its contents you can remember.

The Norton UnErase program worked flawlessly on all our tests, recovering even a severely fragmented test file while disk caching software was running.

PC Tools' Undelete program starts' by giving you a ment from which to choose the file to be unerased, then adds a message noting the chances for recovery. If you agree to the undeletion, you're queried for the first letter of the filename. If all goes well, you'll hear a bit of disk activity and your file will be returned. PC Tools took a bit longer than Norton to recover our 24MB test file—a trivial seven seconds. For difficult undeletions, PC Tools also offers manual recovery.

VERDICT UNERASING A FILE

With Version 8.0, PC Tools' file-recovery capabilities now equal those of Norton Utilities. Your chances of successful unerusing depend more on the condition of your file system than on which package you choose.

Norton Utilities and PC Tools Take On Nine Critical Tasks

TASK	Time	NORTON UTILITIES 6.01	Time	PC TOOLS 8.0
UNERASING (Retrieving o file erased with the DOS DEL command)	O	Commond-line or menu-driven automatic unerosing, monuol unerosing through menu system.		Command-line or menu-controlled unerasing in both automatic and manual modes.
UNFORMATTING (Recovering files and subdirectory structure lost through a DOS FORMAT command)	•	Takes advantage of Image files for complete unformatting or mokes best guess for unassisted formatting. Often recovers files in root directory.	()	Takes advantage of Mirror files for complete unformatting or makes best guess for unassisted formatting. Rarely recovers files in root directory.
DISK REPAIRING (Making a disk usable ofter DOS repeatedly reports errors and refuses to carry out commands)		Checks and automotically repairs boot record, portition table, and FAT, making an undo disk if desired.		Checks and automatically repairs boot record, partition table, and FAT, making an undo disk if desired. Makes an emergency recovery disk.
SURFACE SCANNING (Detecting bad spots on disk and preventing DOS from using them)	0	Part of Calibrate program but often requires running Norton Disk Doctor first.	•	Integrated into DiskFix program, combining surface scanning with other disk-repair operations.
DISK CACHING (Speeding up disk operations by using fast RAM to buffer hard or floppy disks)		Software cache for both disk-read ond disk-write operations. Interactive installation allows you to choose cache size for automatic setup.		Softwore coche for both disk-read and disk-write operations. Con be installed or altered at any time through shell program.
DEFRAGMENTING/ OPTIMIZING DISK (Reorgonizing clusters used by each file to make them contiguous)	(4)	Menu-driven procedure that allows you to defragment files, sort directories, or completely optimize disk. Sometimes simple defragmentation doesn't entirely defragment files.		Menu-driven procedure that allows you to defragment files, so directories, or completely optimize disk Although it often takes twice as long as Norton, it always defragments files.
FILE FINDING (Locoting the disk and directory containing a lost file)		Separate menu-driven and command-line programs locate files by name or contents with filters.		Single program operates in both command and menu modes and locates files by name or contents with filters.
TEXT SEARCHING (Finding o file bosed on a word of text it contains)		Integrated into file finding; also o separate command-line utility.		Integrated into file-find program with both menu-driven and command-li operation.
DISK EDITING (Modifying any byte anywhere on a disk)		Menu-driven system for editing any disk feature from boot record to file. Six display formats make boot records, portition tables, FATs, directory entries, and text and program files readily understandable.		Menu-driven system for editing any dish feature that includes ASCII and tobular display modes. Also includes viewers for examining files (including PCX graphics) in native format.
Relative time to complete task		THE WINNER IS While once Norton offered more secure f difference in the sofety and efficacy of the	two sys	stems. You get more for your money
Lost on task		with PC Tools 8.0—both more functions buy a separate backup system, communic ner, or DOS shell.		

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UNDOING A FORMAT

Whatever the cause, the result of an errant disk format is inevitable—a tabula rusa where your programs and data once resided. Although both Norton and PC Tools try to avoid the problem by giving you a "safe" format utility (they "format" disks without erasing the underlying files), accidents still can happen.

Both Norton and PC Tools offer protection against accidental hard disk formatting in the form of utilities that copy your disk's FAT and directory information to a special file hidden on your disk. Norton calls its version of this utility Image; PC Tools calls it Mirror. Run these through your AUTOEXEC.BAT file each time you boot up or whenever you feel particularly vulnerable. (The PC Tools scheduler lets you choose any time during the day to automatically write a new Mirror file.)

If you want such protection, you'll probably prefer image, which works faster than Mirror. On a 128MB disk with 65MB occupied and 2,400 files in 68 directories, Image ran in 3 seconds, Mirror in 7 seconds. When we pushed each program with 1,758 directories, the difference widened dramatically—Image took 4 seconds, Mirror 88 seconds. If your disk's directory structure is very complex, you should probably schedule Mirror to run during your lanch hour.

Normally, Mirror and Image allow you to restore your disk from a misguided format in a couple of minutes. Norton, however, was flummoxed by one of our test disks and refused to restore from of our test disks and refused to restore from

of our test disks and refused to restore from the Image file we made, requesting that we remove all memory-resident software and try again. We encountered the same message even when booting from a floppy that lacked both CONFIGSYS and AUTOEXEC.BAT files. However, Norton successfully recovered the same disk from the file left behind by PC Tools' Mirror—and in only 81 seconds.

If the wait at boot-up is intolerably long and you opt out of the insurance provided by Mirror or Image, you can still use either Norton or PC Tools to recover an unprotected disk from an inadvertent format. However, the results you can expect vary widely depending on your PC, your file structure, and what you do after you format. To gauge the full range of capabilities, we tried recovering immediately after executing a format and after conying several files to the newly formatted disk.

Both Norton and PC Tools advise you to look for an Image or Mirror file even if you don't think you have one, and each will dutifully scan your disk for the signatures of both programs.

The results of unassisted unformat recovery varied. PC Tools consistently ignored the files in the root directory; Norton often found them. But where PC Tools was able to recover all 1,578 subdirectories on our complex 65MB partition within 30 minutes, Norton bailed out at 27 minutes, announcing that it had run out of room and that we had to copy files out of the root directory (there were no files in the root directory). On other hard disks, Norton fared better than PC Tools, sometimes recovering so well that we could boot immediately from the unformatted disk.

VERDICT UNDOING A FORMAT

The bottom line is that neither Norton nor PCT Tools is a panaeca if you don't take advantage of Mirror or Image. Neither will save you in all situations, and you simply can't predict when one will work better than the other. Take the time to run an insurance program, and either will do the job.



NORTON UTILITIES Withaut Image, a built-in utility that makes unfarmatting easier, Nartan still recavered many root directory and system files.



PC TOOLS PC Tools can unfarmat o disk quickly with the help of Mirrar, o utility that takes o snapshat of your disk's file allocation table (FAT) and directory infarmation.

WE HAVE LAURELS AT TOSHIBA, WE JUST DON'T



PRESENTING THE T44





The PC Magazine's Editors' Choice Award is just one of the many awards our highly acclaimed T4400SXC has captured.



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1 - 8 0 0 - 4 5 7 - 7 7 7 7 Circle 215 on reader service card.

REPAIRING DISKS

Viruses, gremlins, fate, even the phases of the moon conspire against hard disks. Any disturbance to a boot record, partition table, or FAT can stymie DOS and prevent the reading of disk-based data. Both Norton and PC Tools overcome such problems by reconstituting boot tracks, rebuilding partition tables, and refilling FATs. PC Tools automatically builds an emergency distant contains basic recovery programs and personal disk data you will need for successful recovery after disaster strikes.

When we simulated such a failure by overwriting the partition table and FAT on our test disk, DoS decided the disk wasn't its own (running CHKDSK elicited a "Probable non-DOS disk" error) and cross-linked dozens of files into a chain of confusion.

The Norton cure, Norton Disk Doctor (NDD), wasn't fazed by the task, The program automatically checked disk file structure, cited the problems, and gave us the choice of correcting them (and making a disk copy of the original data in case we had to restore the system to its unrepaired state) or leaving the disk unchanged and unrepaired.

PC Tools' hard disk healer DiskFix normally relieves the same symptoms as Norton Disk Doctor but was consistently strained by our directory structure, aborting its directory structure test by dropping back to the DOS prompt with an error message.

VERDICT REPAIRING DISKS

We like the emergency disk, but PC Tools' DiskFix limits you to 1,000 directories. That's sufficient for nearly every PC, except in our permicious test environment. On other hand, Norton Disk Doctor performed flaulessly.

WINNER NORTON



NORTON UTILITIES Norton Disk Doctor exomines your disk's portition table, boot record, and FAT for problems, then prompts you as to whether you want them fixed.



PC TOOLS PC Tools' DiskFix performs the some checkup ond repair as Norton's Disk Doctor, but it does not work as well an disks with 1,000 or more directories.

SURFACE SCANNING

Both PC Tools and Norton check hard disks for surface problems that might be caused by head crashes or the gradual (and inevitable) deterioration of the magnetic fields stored on the disks. Both programs write and read patterns on the disks to spot flaws not detectable with a read/write only scan. They detect and mark bad sectors and move data from marginal sectors into good ones. Each program allows you to specify the thoroughness of the testing by selecting the number of patterns to check. Norton gives you the option of none, 5, 40, or 80; PC Tools, none, 20, 40, or 80. Along the way, both Norton and PC Tools also adjust the interleave of your hard disk for best performance.

PC Tools builds its surface analysis procedure into DiskFx. Norton Disk Dector has only rudimentary surface-analysis capabilities—it makes only a quick read. Norton's real surface-analysis program is included in its Calibrate program, which optimizes disk speed. Several times during testing, we encountered errors while running Calibrate that bounced us out with an error message stating that the problems had to be corrected by NDD before Calibrate would work. We soon realized that the design is just stupid. Calibrate should do the fixing or NDD should do the analysis. We compared the speed of the surface-analysis programs by setting up a 10MB partition and scanning with 40 patterns, the lowest value shared by the two programs. Norton proved faster, completing the

chore in 37 minutes, 31 seconds, compared with PC Tools' 43 minutes, 13 seconds.

On the other hand, Calibrate refused to run a surface analysis on one ESDI test drive that we used for other evaluations. It reported a mapping error that NDD could neither detect nor correct. On other ESDI and IDE disks however, Norton successfully completed a surface scan, PC Tools had no difficulty running the surface analysis on the same disk.

VERDICT SURFACE SCANNING

While the flaws we discovered in Norton's Calibrate were not fatal (they won't cause data to be lost), they do diminish the value of the Norton package. PC Tools' Surface analysis is well integrated and took only slightly longer to run.

WINNER PC TOOLS

DEFRAGMENTING/OPTIMIZING YOUR DISK

The more you use your hard disk, the more scattered the clusters of any given file appear on the disk, and the more the drive's head must fit to and fro to collect all the data. Not only can the process slow to a crawl, but a file with scattered clusters is also more difficult to successfully unerase.

Both Norton and PC Tools include utilities to make the clusters of every file contiguous, a process called defragmentation. And both programs go further, optimizing disks by also rearranging the locations of each file and subdirectory to minimize the movement of the heads during all disk propertions.

PC Tools includes its optimization routines as part of its System Tools under the name Compress. Norton calls it Speed Disk. Both work similarly, first analyzing the disk and reporting how fragmented it is, and then advising the best optimization strategy. When asked to perform a full optimization on our 65MB partition, Compress and Speed Disk produced identical results but at wildly different speeds. Speed Disk finished in 53 minutes; Compress required 2 hours, 42 minutes.

On another disk with the same directory structure, Norton's Speed Disk also proved dramatically faster in simple file defragmentation (11 minutes versus 108 minutes)—but examination of the disk revealed that our large data file wasn't defragmented at all.

VERDICT DEFRAGMENTING/OPTIMIZING YOUR DISK

While Norton's Speed Disk is quicker at defragmenting and optimizing, it occasionally cheats to reach its high speeds, especially during simple file defragmentation. Speed Disk also lacks an automatic reboot function. (Disk optimization leaves the rewritten FAT tables and hard disk format vulnerable unless the system is rebooted!)

In PC Tools' Compress utility, a reboot prompt appears automatically. Although Compress often takes twice as long as Norton's Sveed Disk, it does the better job.

WINNER PC TOOLS



NORTON UTILITIES Nartan's disk defragmenter, Speed Disk, finds all discantiguous file clusters and then advises an aptimization strategy.



PC TOOLS Like Speed Disk, PC Toals' Campress accelerates disk operations by rearranging file and subdirectory lacations to minimize disk head mavement.

Usability Spotlight

When you're having problems with your system, the last thing you need is a utility program with a steep learning curve. We pitted Norton and PC Tools against each other in a gamut of tests to find out which is easier to use.

Bu Joanna Bawa, Usability Editor of PC Magazine (U.K. Edition), and Sandy Reed

The PC/Camputing Usobility Lab tested a late prevelous copy of Central Paint's PC Tools Version 8.0 and Symontes's Norton Utilities Version 6.01. PC/Camputing's technical center director, Nothan Gorcia, oversow the lab subu, which cansisted of Campag 386 PCs equipped with Logitach mice. To give the twa utilities programs plenty to chew on, we loaded and deleted applications software, capied large data files acrass and bock, created multilevel subdirectairies, and stoshed oway hidden text and stray files of many types on the hard disks. After each test session, we wiped the disks clean and relaaded the some conflauration.

We designed our tests to reflect the use of utilities software in typical situations—both emergency data recovery and general disk and file maintenance.

Our testers onswered detoiled questions relating to the interface of each praduct, its monuals, and anline help. Each then campleted a 40-paint soffsection questionnoire, rating praduct features an o scale of 1 to 5 (5 being best) for usability.

Four competent camputer users carried aut our tests. Each tester was familiar with at least one of the products and reviewed both products.

HOW THE PRODUCTS FARED

Our results revealed a clase motch between the two practicuts in many areas of operation, though each share in a different way. Our final results revealed a higher productivity scare for Nartan Utilities, however, and a considerably higher solfsaction rating—163 vs. PC Taols' 134. (See the chort on page 325 for debils, Norton Utilities is also more intultive; testers recorded for the monutos less of ten than with PC Tools and gained more from them. Post test interviews with our testers gave us mare information. Utilimotely, we awarded the usability crown to Nortan Utilities.

Observations: Nortan Utilities' interface is, for want of a better word, utilitorian. It's nat instantly attractive, but it

takes na more than o alonce for you to reolize that everything you wont and need is there, cleorly displayed, eosily occessible, and thaughtfully exploined, Nortan's screens aren't resizoble and the red-an-blue calar scheme is not easily configurable, but it's cansistent thraughout aperations and follows the tenets of usability: Nortan's help is easy to lacate but invisible until you want it-yau con sofely concel all operations with Esc. all user actions generate feedback, and every screen includes o Quit option. Though an immensely powerful tool, Narton exhibits none of the traits characteristic of power tools abscure terminology, complicated lagic, and incomprehensible commands. If a geored to new and accosional users but doesn't compromise the requirements of expents; a discreet command line is present in every screen, allowing lold hands to type commands, switches, and porameters and cut through the falls when they're no langer needed.

cut through the tritist when they for an obegar needed.

Narion Utilities' monuels ore surprisingly good, covering
well-defined subjects in depth without being terrifyingly
large. They're clearly laid out ond extremely well written,
explaining each utility occording to what it does, how to
use it, and where relevant, it slimitations. Narton Utilities
mokes it easy to become on expert; of no point ore you left
honging, wandering if you've just irrevocably damoged
your dot. A more farceful reboar recammendation after
disk reorganization would be useful, but opart from this,
Narton Utilities is fost, efficient, reliable, and usable.

If Narian Utilities' interface is simple, PC Tools' interface is beautiful. At first glance, it's mare readable than Nortan's, mainly because it uses dark text against a light background. It's also mare canfigurable and campact. A considerable amount of thought has gane into its design, and it certainly takes the mystique out of disk maintenance. I also has an ever-present cammond line, othough it's groyed aut until you actually select it. PC Tools inspires greater confidence than Nortan when you first jump in, but its terminology is sametimes enigmatic (the exact meaning of campress, for example, was frequently misunderstaad by users).

Behind the pretty face, PC Tools has more features than it's passible to imagine uses far. The monuals are generally good but suffer fram a slight ambiguity of terms, although the Quick Reference guide proved very papular. Despite some novigational problems, PC Tools' manuals are well written and generally supply the information you need they lock the simple, absolutely clear structure of Nartan's manuals, but the same information is there if you're prepared to scan less and read more provided to scan less and read more provided to scan less and read more than the same information is there if you're prepared to scan less and read more.



To measure overall productivity for each program, we totaled the time it took the user to complete each task and divided by the number of tasks. Even when we threw out installation times, Norton beat PC Tools by at least a minute.

Conclusions: For all its power, Nortna Utilines is very easy to install and entirely undemanding. Throughout usage, it makes a clear and cansistent distinction between firstliner are accessional users and serious experts, without limiting the needs of either. It's supportive without being in: intitioningly "helpful" and its terminology is crystal clear without being in: and the state of the control of the co

PC Taals beats Nartan in terms of desktap utilities and interface design, creating a frant-end management package as crammed with goadies as its back-end maintenance tool set. Installation is simpler than in previous versions, but it still invalves the user in no less than a dozen interactions that reautire increasingly complex decisions. Once you're

past installation, however, PC Tools has a clear interface and operates smoothly. There's little to differentiate it and Nortan for general operation, but in terms of numbers of features and functions, it streaks ahead. In terms of useful mass and relevance, however, its desktap-management facilities scare fewer points and may even threaten to clutter the desk of a user already equipped with the standard accessories.

With vital information at stake, it's critical that users be able to solve their problems simply and directly. Notator's strength lies where it is most needed, whereas PC Toals is strong in areas which dan't contribute as much to utility unctions. They're both excellent products, but PC Toals spreads its qualities toa thin. The Notaton Utilities, by cancentrating on care functions, keeps in closer touch with its users and does a better ich overall.

	NORTON UTILITIES 6.01	PC TOOLS 8.0
Emergency Retrieval Lacation of instructions	Label of disk	
Number of steps	Label of disk	Label of disk
User input	5	4
System feedback	Drive, directory, filename "Recovered" anscreen	Drive, directary, filename
Time for task (in minutes)	"Kecovered" anscreen	"Recavered" anscreen
Time for lask (in minutes)	- 2	2
Installation		
Number of disks	4	5
Number af user interactions	4	17
Knawledge assumed	Basic	Pragram features
	Yes	Yes
Safe ta use default aptions? Time for task (in minutes) Disk Data Check and Error Correction	8 PM	19
Time for task (in minutes) Disk Data Check and Error Correction Name of utility Number of steps	8 Disk Dactor 2	19 Disk Verify 2
Time for task (in minutes) Disk Data Check and Error Correction Name of utility Number af steps Type af feedback	Disk Dactor 2 Running Indicatar	19
Time for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of steps Type of feedback Time for task (in minutes) Permanent Delete	8 Disk Dactor 2	19 Disk Verify 2
Time for task (in minutes) Disk Data Check and Error Correctic Name of utility Number of steps Type of feedback Time far task (in minutes) Permanent Delete Name of utility	Disk Dactor 2 Running Indicatar	19 Disk Verify 2
Time for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of steps ype of feedback inne for task (in minutes) Permanent Delete Name of utility Number of steps	B Disk Dactor 2 Running indicator 6 Wipe Infa 2	Disk Verify 2 Gas gauge status line 7
Time for task (in minutes) Disk Date Check and Error Correctic Name of utility Vumber of steps Type of feedback Time for task (in minutes) Permanent Delete Name of utility Vumber of steps Vumber of steps Vumber of steps Vumber of steps	Disk Dactor 2 Running indicator 6	Disk Verify 2 Gas gauge status line 7 Wipe File
Time for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of steps ype of feedback inne for task (in minutes) Permanent Delete Name of utility Number of steps	B Disk Dactor 2 Running indicator 6 Wipe Infa 2	Disk Verify 2 Gas gauge status line 7 Wipe File 3
Time for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of steps (ype of feedback time for task (in minutes) Permanent Delete Name of utility Number of steps ype of feedback time for task (in minutes)	B Disk Dactor 2 Running indicator 6 Wipe Infa 2	Disk Verify 2 Gas gauge status line 7 Wipe File 3 Warnings, verification of action
Filme for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of seps Vipe of feedback Time for task (in minutes) Permanent Delete Name of utility Number of steps Vipe of feedback time for task (in minutes) Interview of the permanent of the p	Disk Dactor 2 Running indicator 6 Wipe Infa 2 Verification of intent ta delete 1	Disk Verify 2 Gas gauge status line 7 Wipe File 3 Warnings, verification of action
Filme for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of steps Vipe of feedback Inne for task (in minutes) Permanent Delete Nome of utility Vumber of steps Vipe of feedback Inne for task (in minutes) Inne for task (in minutes) Interval to the control of	Disk Dactor 2 Running indicator 6 Wipe Infa 2 Verification of intent ta delete 1 2.5 0	Disk Verify 2 Cas gauge status line 7 Wipe File 3 Warnings, verification of action
Filme for task (in minutes) Disk Date Check and Error Correction Nome of utility Number of seps Vipe of feedback Time for task (in minutes) Permanent Delete Name of utility Number of steps Vipe of feedback time for task (in minutes) Interview of the permanent of the p	Disk Dactor 2 Running indicator 6 Wipe Infa 2 Verification of intent ta delete 1	Disk Verify 2 Gas gauge status line 7 Wipe File 3 Warnings, verification of action 2

DISK CACHING

While Ille defragmentation can add a trace of speed to overall disk performance, a software disk cache delivers quantum improvement. Both Norton and PC Tools include their own disk caching programs that hold oftenued disk data in RAM, all but eliminating the delays imposed by drive mechanisms during read and write operations and accelerating drive perfor-

mance markedly.
Only the installation differs. The Norton cache installs through a menu-driven utility, Nuconfig, and can be loaded through your PC's CONFIG.NS' or AUTOENEC.BAT files. The PC Tools cache is automatically installed during the overall installation of the vorcaram package

or at any time from the Speed menu option in the PC Tools shell. Setup options include cache size during DOS operation, the kind of memory to use (conventional, extended, or expanded), and, when Windows is running, cache-delayed writing.

VERDICT DISK CACHING

The Norton and PC Tools caches and SMARTDRY.EXE, the cache included with Windows, turned in comparable results. Although PC Tools pulled ahead by about 10 percent as record size increased, the difference was minor compared with the overall improvement over wacached verbranace.

WINNER TIE

FILE FINDING AND TEXT SEARCHING

Often the slowest memory involved in computer operations is your own—you can't remember in which subdirectory you put an important file or which file holds specific text. Both Norton and PC Tools give you a menu-driven means of locating a file by name or contents, and both ealt this utility. File Find

tents, and both call this utility File Find.

Each offers an onscreen form for entering as many details about the file as you can remember—

the filename and/or a word or two of text inside it. Then the program scans your disk. When the file is found, both programs tell you where it is and log into its directory at a keypress.

The functional differences between the two File Find programs are minimal. PC Tools searches for a combined pathname and filename or a text string of up to 127 characters (only 32 of which are visible onscreen). Norton limits you to path and filenames or text strings of 85 characters (50 appear onscreen). Both programs search across multiple drives, although only Norton reaches network drives and filters by the networked file's owner. Norton also includes command-line file and text-locating programs, File Locate (FLEXE) and Text Search (TSEAS)

VERDICT FILE FINDING AND TEXT SEARCHING

The relative speed of the PC Tools and Norton menu-driven programs varied with the task. On a cluttered drive, Norton took 31 seconds to find a file by name; PC Tools, 48 seconds. PC Tools located text about 10 percent faster than Norton. However, Norton earns the edge for its command-driven alternatives.

WINNER NORTON

File Sourch List Convoids Usage Quitt Fideip

FileTode

NORTON UTILITIES Norton's File Find limits you to path

NORTON UTILITIES Norton's File Find limits you to path ond filenomes or text strings of 85 chorocters, but more of them appear onscreen than in PC Tools.



PC TOOLS Like Norton's file-finding utility, PC Tools' File Find con norrow your search for a forgotten file by using filters for file date, size, and attributes.

DISK EDITING

If you want to take direct hardware control of your hard disk so that you can peer into otherwise forbidden areas such as the partition table, boor teeord, and bytes of directory entries, both Norton and PC Tools will accommodate your most devious designs. With either, you can alter data to correct errors—or guarantee that your system will never boot again; therefore, proceed with caution.

In Norton Utilities, DiskEdit lets you view or alter any drive, directory, file, cluster, logical or physical sector, partition table, boot record, or FAT copy. It automatically tries to match the best display format to the data—a hexadecimal, text, directory, FAT, partition table, or boot record display—but it lets you override its choice. Its edit ontion allows you to simply

type over existing changes or to mark, copy, paste over, or fill blocks. You can also link clusters or files.

Where DiskEdit is the centerpiece of Norton, PC Tools puts it on its periphery, offering just a single menu selection from the main PC Shell menu. Even so, its range is as wide as Norton's, covering an entire disk from boot record to last byte, and it has all the display choices and editing powers of the Norton program.

VERDICT DISK EDITING

PC Tools includes a standalone file viewer (VIEW) that lets you view 37 file formats and display the contents of PCX graphics files. As with the rest of the package, PC Tools gives you more alternatives for editing and displaying files.

WINNER TIE

SYSTEM DIAGNOSTICS

If you want to know how well your PC performs or what's inside it, both PC Tools and Norton let you take to look with a system-information feature. Hardy a trivial function, this feature helps you determine what options are installed inside your PC and how well they work without requiring you to remove its cover.

Norton's SysInfo starts with a summary, divided into individual boxes that hold basic system information (system class, BIOS maker and date, video system), number of disks, memory capacity, and I/O details (bus, ports, keyboard, and so on). PC Tools calls its investigative program SI. Its opening screen provides nearly the same information as Norton's, augmented with three bar charts showing installed memory—one each for

conventional, extended, and expanded.

Both investigative systems let you request detailed individual reports such as the type of video board, its memory, and the character size (in pixels); the assignment of hardware and software interrupts (including the addresses and the programs that use each one); and the CMOS configuration of the PC. Neither program allows wu to change those entries.

Both programs evaluate several aspects of system performance—the microprocessor, memory, disk, and video systems—and assess overall performance both in text and bar chart form. Oddly, however, the two programs yield entirely different benchmark results. Norton proved the more optimistic, reporting CPU



NORTON UTILITIES Nartan's system information has a text-based summary screen that includes system class, BIOS maker and date, videa adapter, and memary.



PC TOOLS PC Taals' apening system information screen gives less detail, but it charts conventional, extended, and expanded memory use and indexes system performance.

Norton Utilities and PC Tools Side by Side

	NORTON 6.01	PC TOOLS 8.
FILE RECOVERY	NORION 6.01	PC 100LS 8.
Menu-driven unerase/undelete	V	V
Cammand-line unerase/undelete	V	V
Automatic finding of clusters	V	V
Manual cluster search	V	V
Partial recovery of averwritten file	V	V
Windaws unerase/undelete utility	×	×
Optional deletian tracking		V
Recaver deleted subdirectory	V	V
Recaver files fram deleted directories	V	V
Campatible with network drives	V	V
Unformat disks with Mirrar/Image	V	V
Unfarmat disks without Mirror/Image	V	V
APPLICATION FILE REPAIR		
Repair Latus 1-2-3 files with invalid cells	V	V
Repair Lotus 1-2-3 files with damaged farmat		V
Repair passward-encrypted Latus 1-2-3 files	×	-
Repair xBASE file header domage	V	-
Recover zapped xBASE files	V	-
Repair xBASE recard frame file errors		-
Repair xBASE illegal field characters	V	-
Fix xBASE embedded EOF morker	-	-
View files in native farmat	Deficient	7
DISK REPAIR		
Repair domaged baat recard	V	V
Repair bad partition table	-	-
Repair scrambled FAT	- V	V
Repoir scrombled roat directory		7
Repair crass-linked files		-
Find/chain last clusters	V	-
Create unda disk		
Disk repoir under Windaws	×	V
Lift data aff damaged disk	7	-
Repair sectar not faund errors	V	V
Remedy seek errars	V	V
Remedy demagnetization problems	V	V
Realign hard disk heads	V	V
Realign flappy disk heads	V	V
Diagnase write-pratected disks	V	×
PREVENTIVE MEASURES		
Perfarm read integrity test an files	V	V
Perfarm read integrity test on disks		V
Perform write integrity test an files	V	V
Perform write integrity test an disks		V
Perform pattern tests		V
Number of patterns	0,5,40,80	0,20,40,80
Safe farmat pragram included	V	V
Optianally disable hard disk farmatting		V
	V	V
List files befare farmotting		V
List files befare farmotting Prevent virus writing Detect baat-recard virus		V

	NORTON 6.01	PC TOOLS 8.0
PERFORMANCE ENHANCEMENT/MEASUREMENT		
Disk read caching	V	V
Disk write caching	V	V
File defragmentation	V	V
Disk aptimization	V	V
Allaw directary ardering	V	V
Allaw pasitianing of files	V	V
Disk interleave tuning	V	V
Micrapracessar benchmarks	V	V
Memary benchmarks	V	V
Disk benchmarks	V	V
Repart interrupt usage	V	V
Repart memary usage	V	V
Repart micrapracessar type	V	V
Repart system/BIOS manufacturer and date	V	V
VIEW/EDIT ABILITIES		
View baat recard	V	V
Edit baat recard	V	V
View partition table	V	V
Edit partition table	V	V
View FAT in byte farmat	V	V
View FAT in tabular farmat	V	V
Edit FAT	V	V
View directories in byte format	V	V
View directories in tabular farmat	~	V
Edit directories	~	V
View any disk sector	7	V
Edit any disk sector		V
View any disk cluster	V	V
Edit any disk cluster	V	V
View any file	V	
View files in native farmat	×	
Number of farmots supported	N/A	37
Edit any file	17/2	
Change file attributes	V	
Change file dote stamp	V	
Search for data while in editar	V	V
Map file clusters in tabular farmot	V	
The closicis in labelar familiar		
TEXT AND FILE SEARCHING AND MANAGEMENT		
Lacate files ocrass multiple drives	V	V
Lacate directaries		
Lacate text acrass multiple drives		
Locote files by application type	×	
Filter files by date, attribute		
Define custam file filters	V	
Print file lists	V	
Find duplicate files ocrass multiple drives	×	
Manualtivan file (toxt correling		
Menu-driven file/text searching	V	
Menu-driven file/text searching Cammond-line file/text searching	V	V
Menu-driven file/text searching Cammond-line file/text searching Quickly ga ta any subdirectary	~	V V
Menu-driven file/text searching Cammond-line file/text searching	V	V

PC/COMPUTING FACE-OFF



NORTON UTILITIES Nartan's relative CPU speed index campores vaur system's micrapracessar perfarmance with that of a Campag 386/33 MHz and an IBM AT and XT.

measures your system against the IBM XT and, for a mare appearance counts, the SI portion of PC Tools gives the better report, with all information presented in dropshadow boxes against the Windows-like background.

PC TOOLS The averall performance index in PC Tools

relevant camparisan, the IBM PS/2 Madel 65SX,

File System Disk Memory Benchmarks Help

performance that was noticeably higher than PC Tools', despite the fact that both used the same XT system as the measuring unit. Similarly, Norton reported better disk performance than did PC Tools-and a data-transfer rate that was about one-third higher, Norton also reported average access

times that were about 5 percent slower. While you may evaluate systems with either program, you cannot compare the two programs' results because Norton and PC Tools use incompatible measurement systems. If VERDICT SYSTEMS DIAGNOSTICS

CONCLUSION

If you call upon DOS 5.0 to undelete a file, you get a primitive text screen that presents you with filenames and a query asking whether to unerase. Though often effective, DOS 5.0's veneer of protection quickly wears thin as your disk becomes cluttered with erased files. And with DOS 5.0, it's still very easy to eradicate every file from a disk with a format command, Norton Utilities and PC Tools help you recover from a data disaster and help prevent future calamities.

In our usability testing, Norton beat out PC Tools, but not by much. Norton proved to be more intuitive and easier to work with, and users accomplished the job faster. But our testers loved the thoughtful design and functionality of the PC Tools' interface.

Forever pegged as the latecomer, PC Tools compensates by giving you a bit extra, such as a powerful DOS shell and utility functions like virus detection and elimination and memory maximization. Without a doubt. PC Tools gives you more for your money and is the better all-around program. But if you're after only the core utilities-the power to take command of your PC, to recover from disaster, and to get the most from your PC-Norton Utilities remains an efficient tool.

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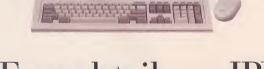
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Techniques That Take Batch Files Beyond the Basics

DOS'S BATCH LANGUAGE ISN'T THE LIGHTWEIGHT YOU THOUGHT IT WAS, PUMP UP YOUR PROGRAMS WITH THESE TECHNIQUIES BY JEEF PROSISE

NEARLY EVERYONE HAS written a batch file, but few realize the true power of DOS's batch language. On the surface, the language is too simple to qualify as a real programming language. Yet with a few simple tricks, you can bring batch file programming to a new level. In this month's column, we examine two techniques that you can use to build more powerful programs.

DOS Can Do Subroutines

Most sophisticated programming languages allow you to roll often-used routines into separate modules called subroutines that can be called repeatedly from elsewhere in the program. This keeps code concise and makes programs modular and organized. DOS's batch language doesn't support subroutines at least, not overtly. But you can use a little-known feature of the GOTO command to call a subroutine anytime.

Here's how it works. Normally, GOTO commands point to labels, as in GOTO START. What many users don't realize is that GOTO also accepts label names stored in environment variables. The following batch statements, for example, are equivalent to GOTO START.

SET LABELNAME=START GOTO %LABELNAME%

You can create batch file subroutines by placing a label (the subroutine name) at the start of the subroutine and making GOTO %RETURNS* the final statement in the subroutine. To call a subroutine from anywhere in your program, set an environment variable named RETURN, for example, equal to the label, and place it directly below the line that calls this subroutine. Execute a GOTO statement to jump to the beginning of the subroutine. This is illustrated by the following batch file fragment:

REM This sets the environment REM variable and calls the REM subroutine. SET RETURN=HERE GOTO SUB

· HFRF

*:SUB REM Place subroutine statements REM below. GOTO %RETURN%

The statement GOTO SUB transfers control to the subroutine SUB and exceutes any commands. When GOTO %RETURN's is reached, the batch file returns control to the line labeled HERE, because the environment variable RETURN was set equal to HERE before the subroutine was called. Use a unique return label (for example, RE-TURNI) each time you call SUB, and you can call it as many times as you like.

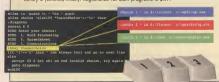
Get Keyboard Input

One of the greatest weaknesses of DOS's batch language is the lack of a command that lets batch files read input directly from the keyboard. This deficiency is easily fixed with a short utility that you can create with DEBUG. Enter the following lines into an ASCII text editor, and save the file as INKEY.SCR.

N INKEY.COM E Ø1ØØ B4 Ø8 CD 21 C3 Ø1 Ø1 6Ø

STACKEY and BATUTIL

INKEY pumps up your batch files, but Crifall Associates' STACKEY and BATUTL fire them into warp drive. STACKEY simulates keystrokes in batch files by stiffing them into the keyboard buffer. Its camponian, BATUTL, gives you instant occess to system infarmation, such as time and date, and reads strings from the keyboard and places them into environment variables. Call the company of 1800/872-4768, fax an order of 1301/87-3732, or download SEKY30-EKE from Pc/Cantact's data lithrary 3 (Utilities Miss.). Resistration for batch programs is \$49.



E Ø1Ø8 Ø1 RCX ØØØ9 W

Enter DEBUG < INKEY.SCR to create INKEY.COM, which returns the ASCII code of any key pressed. The key code is in a form that can be tested with the DOS command IF ERRORLEVEL. It is up to your batch file to distinguish between uppercase and lowercase characters, because their ASCII codes differ.

The following batch file tests for the existence of any subdirectory name you enter at the DOS prompt; if the subdirectory doesn't exist, the batch file prompts you to press Y to create the subdirectory or N to continue.

IF EXIST C:\%1\NUL GOTO EXISTS :ASK

ECHO Subdirectory does not exist. ECHO Create it (Y/N)?

IF ERRORLEVEL 78 IF NOT ERRORLEVEL 79 GOTO END

IF ERRORLEVEL 110 IF NOT ERRORLEVEL 111 GOTO END IF ERRORLEVEL 89 IF NOT ERRORLEVEL

90 GOTO CREATEIT IF ERRORLEVEL 121 IF NOT ERRORLEVEL

122 GOTO CREATEIT
GOTO ASK
:CREATEIT
MD C:\%1
GOTO END
:EXISTS
ECHO Directory exists!

:FND

INKEY pauses the batch file until a key is pressed and sets an error level equal to the key's ASCII code. The first two IF ERRORLEVEL statements branch to the end of the batch file if N or n (ASCII codes 78 or 110) is pressed (the statement IF FERRORLEVEL z F NOT ERRORLEVEL z +1 is an efficient way to the statement of the code of z is pressed to GREATEIT if Y or y is pressed, if none of these tests succeeds, the statement GOTO ASK is executed, and the (NN) prompt is redisplayed.

/// **Hot Tips** ////////////////

Clock Your DOS Prompt

Display the date and time in bright calars anywhere an your screen. Call the fallowing batch file fram AUTOEXEC.BAT, and you'll always have the time handy. Enter these lines in a text editar, and save the file in ASCII farmat as TIMER.BAT.

@ECHO OFF
IF "%1"=="" GOTO HELP
GOTO OK
:HELP
ECHO Syntax: TIMER A B C D

ECHO A=Text Color: 3Ø=BLACK 31=RFD 32=GREEN 33=YELL0W FCHO 34=BLUE 35=MAGENTA 36=CYAN 37=WHITE ECHO B=Background: 4Ø=BLACK 41=RED 42=GREEN 43=YELLOW FCHO 45=MAGENTA 46=CYAN 44=RLUE 47=WHITE

ECHO C=Row Number ECHO D=Column Number

GOTO EXIT

:UX
PROMPT \$P\$G\$E[\$\$E[%1m\$E[%2m\$E[%3;%4H \$d \$t \$E[37m\$E[40m \$E[u :EXIT

Make sure there's a line in CONFIG.SYS that loads ANSI.SYS, and run the program with different parameters to experiment with the calor and opsision. When you've gair it set the vary you want, replace your current PROMPT statement in AUTOEKE.

8.AT with a line like the fallowing, which displays the time and date in white text an a blue background in the upper right corner of the screen;

CALL TIMER.BAT 37 44 1 50

MICHAEL TRUMBAUER

Make CD Change Directories and Drives in One Command

Dan't enter multiple cammands to change to a different drive and directory. Use a DOSKEY macro and a batch file to make the CD cammand do it all in one step. Enter these lines in a text editor, and save the file in ASCII farmat as CDD.BAT:

@ECHO OFF
IF %1|I==! COTO END
FDR %3X in (A B C D) DO IF %3X==%1 GOTO CH_DRV
FDR %XX in (a b c d) DO IF %3X==%1 GOTO CH_DRV
GOTO NEXT
:CH_DRV
%1:
CSHIFT
:WEXT
CD\%1
CD\%2 > NUL
CD\%3 > NUL
:NND

Then create the DOSKEY macra by adding the fallowing line to AUTOEXEC.BAT, replacing any existing DOSKEY statement:

CONTINUED ON PAGE 338



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DOS

CONTINUED FROM PAGE 337

DOSKEY CD=CDD.BAT \$*

Ta change from the roat of drive C: to a subdirectory named APPS on drive D:, for example, enter

CD D APPS

CDD.BAT is set up to use drives A, B, C, and D. If you've gat additional drives, add them to lines 4 and 5 of the botch file. The pragram can move to directories up to three levels deep. Add extra IF and CD% parameters to expand its functionality.

JACK DOM

Break Through DOS's RAMDRIVE Limitation

The DOS 5.0 manual says that the maximum size for a RAM disk using the RAMDRVE command is 4,096K, but in fact you can boast the capacity to 32MB—which is plenty at 5acce if you've got the extra RAM. Add this line to your CONFIG SYS to make a 15MB RAM disk fram extended memory:

DEVICE=C:\DOS\RAMDRIVE.SYS 1536Ø 512 32Ø/F

Madify the first number according to the RAMDRIVE size you want, and replace the /E with /A to create the drive in expanded memory. The RAMDRIVE will appear as your next available drive—make sure you've got a LASTDRIVE statement in your CONIFIG.YS's set equal to this drive letter.

BENJAMIN HSIU-SHU LIN

Locate Several Files at Once

Find last files quickly with a batch file that searches far multiple filenames. Enter these lines in a text editor, and save the file as LOCATE.BAT in a directory listed in your PATH statement.

@FCHO_OFF

IF "%1"=="" GOTO SYNTAX

ECHO Located File List > FOUND.TXT

CD\

:START

REM IF "%1"=="" GOTO VIEWLIST

ECHO Searching for %1...

ECHO Files Meeting Search Criteria "%1"... >> FOUND.TXT

DIR %1 /B /S >>FOUND.TXT

ECHO.>>FOUND.TXT

SHIFT
IF NOT "%1"=="" GOTO START

TYPE FOUND.TXT | MORE

DEL FOUND.TXT

REM GOTO START

GOTO END

:SYNTAX

ECHO LOCATE can find multiple files on any directory.

ECHO SYNTAX: LOCATE [filename1] [filename2] ... [filename#]

To track down the files, enter LOCATE followed by their filenames. The batch file uses DOS 5.0's DIR cammand to search for the files and the batch cammand SHIFT to laap through the program. The results of the search are appended to a file named FOUNDIXT, which can be viewed with the TYPE cammand, then deleted.

A. SHIWRAM

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DOS is still the preferred operating system on over 80% of the PCs in Fortune 1,000 companies, according to recent studies.

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Scaling DOS Windows Is Possible—But Not Easy

LOOSEN UP THE DOS WINDOW WITH A SYSTEM.INI TRICK

NOBODY SAID RUNNING DOS applications in a window would be easy. The first time you can't see all the text, you reach for the mouse to resize the window, and the window barely responds. Then you remember that Windows 8:1 allows you to change the fort for non-Windows apps, so you click on the Conroll menu, choose Fonts, and switch to one of the smaller sizes on the list—say, of x 8. This ought to do it. If Windows won't enlarge the window, you'll just have to shrink the type. You click on OK, and ... Windows shrinks the window and the type at the same time.

What's going on here? Why can't Windows fill the screen with your windowed DOS app—or at least cram a few more words into the window at its current size? Well, it can, but not in any way you'd expect.

More DOS to Your Window

DOS windows are different from both Windows apps and DOS programs. Ask Windows to display a DOS application in the DOS application in the DOS application in the DOS application in the DOS application and presents the picture of whatever the DOS app would be showing and presents the picture within a normal-looking window frame. You can exclude parts of the picture from view (in effect, cropping the picture) by dragging the borders inward. But you can't add anything to the picture that wasn't aiready there. In other words.

Winann of the Month



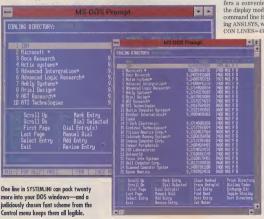
Windsock and Windsock SRM

Of oil the system-monitoring programs you can find, the two freeware Windsock programs system for the coke. Windsock programs system for the coke. Windsock programs system for processor type, memory size, ovoilable system processor type, memory size, ovoilable system resources ond sounds on save SCPU, disk, and video performance to boat. Windsock SRM reports ovoil-able system resources and sounds on adam if any resource heap folls below a specifical level. Both utilities or covoil-a full state of the control of the state of the covoil-a full state of the

Windows can't show you any more text than the DOS app would display if it were running full screen.

The key to getting more text in a DOS window is to make the DOS display show 43 lines or 50 lines per screen instead of 25. If your DOS program of fers a convenient command to switch the display mode, then use it. (The DOS command line itself can be changed, using ANSLSYS, with the command MODE CON LINES 430 rs 60.)

To have all your DOS applications run in 43- or 50-line mode by default, make a change to your SYS-TEM.INI file. After backing up the file, open it in Notepad or Sysedit. Under the heading [NonWindows-Appl, look for the line ScreenLines=25. If it's there, replace the 25 with either 43 or 50. If it's not, insert the line and add one of the higher numbers after the equal sign. Then save the file and quit Windows, Next time vou enter Windows. most DOS apps (with a few notable exceptions, such as 1-2-3, which have their own configuration routines)



will open in the higher-screen-line display mode you selected.

Can You See the Next Line?

If running in 43- or 50-line mode makes vou squint like Mr. Magoo, use the Fonts command on the DOS app's Control menu to choose a larger size For example, to make a maximized 43-line program fill a Super VGA screen almost exactly, switch from the default size (8 x 12) to the next size up (10 x 18), To keep the same program from overflowing a standard VGA screen without unduly sacrificing legibility, drop back from 8 x 12 to 8 x 8

If the object is to make the DOS app come close to full-screen size when maximized, why run it in a window at all? The compelling reason is that windowed DOS apps enjoy the same cutand-paste privileges as Windows programs. For example, you'll be able to write e-mail messages in your favorite Windows word processing program and copy and paste them into your preferred DOS communications package,

Working with the Clipboard from a windowed DOS program is almost the same as working with the Cliphoard from a Windows program-but not quite.

Cut and Paste with DOS

First click on the DOS window's Control menu and select Edit. Choose Mark. then use the mouse to select the area of the DOS window to copy, and press Enter. If you've copied text, the Clipboard will contain unformatted ASCII text. Graphics selections (or any formatted text that Windows can't interpret) are copied as bit-mapped images.

To paste text from the Clipboard to a DOS application, switch to the application you want to paste to and position the cursor where you want the text inserted. Ensure that the program is running in windowed-display mode and select Edit. Paste from the DOS window's Control menu. Windows inserts the Clipboard's text into the DOS application character by character, as if you were typing it on the keyboard.

However, there is more to running DOS applications under Windows than changing window size and appearance. Next month, we'll look at techniques for optimizing character-based applications in a graphical environment.



Tame Your Unruly Hard Disk

File Manager makes it a snop to impase order an your hard disk. Want to collect all your text files in a single directory? In File Manager, move to the root directory of the appropriate disk. Chaase File, Search, and specify *.TXT in the Search Far: bax. Ensure that the Search All Subdirectories bax has an X in it and click an OK File Manager will create a new window that cantoins every file an your hard disk with a .TXT extension. Ta mave all af these files to a new directory, first ensure that

a windaw displaying the new directory is visible. Then select the first file in the seorch window hold down the Shift key while you click an the last file, and draa this selection anta the destination

directory. Use the same approach ta aather batch files and PIE files or to remove all BAK files fram your disk.



Make Your Temp Files Truly Temporary

Do vau still find TMP files scattered throughout your directories? If you periodically encounter general pratection errors, or if you use ill-behaved programs that dan't tidy up after themselves, you clutter your directary listings with unwanted files. And while many are zero-length, same contain data and thus waste disk space. Here's a system far keeping TMP files in check. First, ensure that you have a TEMP directory, and paint all programs to it with two lines like these in AUTOEXEC BAT-

SET TMP=C:\TEMP SET TEMP=C:\TEMP

If your current setup is missing either of these lines, enter it-both are necessary to instruct all applications that use TMP files. Next, either create ar apen the batch file that laads Windaws, and an the last line, enter a line to clear the TEMP directary. Here's an example of such a batch file:

@FCHO OFF

CD \WINDOWS

WTN ECHO The following line clears the TEMP directory.

ECHO Y | DEL C:\TEMP*.TMP

This botch file deletes the cantents of the TEMP directory whenever you guit Windows in the usual way, but whenever Windows croshes and you need to salvage the cantents of a TMP file, it's still there when you restart Windows.

MATTHEW LAKE

A Leaner, Meaner Windows

Make the mast of your loptop's precious disk space and bottery power and aptimize Windaws far partable camputing. Windows Setup makes it easy to remave nanessential Windows campanents when your hard drive starts to fill up. Ta start Setup, dauble-click on its ican, ar chaase File, Run fram Pragram Monoger

CONTINUED ON PAGE 342



Software piracy isn't just a crime. It's a shame. Because most people who do it aren't even aware that it's illegal. If you copy software that's protected by copyright, you could lose your job. face a civil suit, pay a \$100,000 fine and possibly be imprisoned. So get the facts now. To request more information, contact the Software Publishers Association at 1-800-388-7478, Because in a court of law, ignorance is one thing you won't be able to plead.

1-800-388-7478 16



Don't Copy That Floppy

Windows

CONTINUED FROM PAGE 341

and specify SETUP.EXE in your Windows directary. Choose Options, Add/Remove Windows Components. To remove a component, clear its check box, It's possible to remove all of the components listed without harming Windows' operation. If you want ta keep some

files, such as accessaries or wallpaper that you can't do without, click on the Files hitton for the relevant component Then move all the files-except those you want to keepinto the box labeled "Do not install these files " and click OK to return to the Add/ Remove dialog box Finally, click on OK to remove the compo-



Total Available Disk Space

Dark Space Freed by Current Selection 890 132 Pater 24,678,400 Bytes

nents and files you selected.

Next, select a dark color scheme in Cantrol Panel, to save battery power. Since light colors drain more power, use them only for text and other Windows items that require high contrast. Change the Window Background color to black or another dark hue

Finally, if you use keyboard shortcuts to navigate Windows, remove your mouse driver so that the mouse pointer doesn't get in the way. From Setup, choose Options, Change System Settings, and change the Mouse: option to No Mouse. Click an OK.

MOIRA MOYNIHAN

Instant Screen Saver

The Windows 3.1 screen saver helps protect your system with its password option. Improve on this security by setting up a Program Manager icon to start the screen saver on demand, not just after a specified delay.

Set up the screen saver with a password. In the Control Panel, choose the Deskton icon. Select a screen saver, click on Setup, and put an X in the Password Protected bax. Click on the Set Password button and return to Program Manager.

Next, add the screen saver to Windows' list of executable programs. With Notepad or any plain-text editor, open WIN.INI. (As always when editing system files, make a backup of WIN.INI before you begin.) Add the extension scr to the end of the Programs= line. It should look something like this:

Programs=com exe bat pif scr

Save your changes and exit Notepad. In Program Manager, choose File, New; select Program Item; and click on OK. Enter an icon title in the Description: box, and enter SSMARQUE.SCR /S in the Command line; box to specify the Marquee screen saver. If you want another screen saver, use Browse to find it in your Windows directory-all Windows screen savers have an .SCR extension-and ensure that the command line includes the /S switch after the program name. Specify a hatkey in the Shortcut key: box, and click on OK to return to Program Manager. To password-pratect your system, double-click on the screen-saver icon or use the hotkey.

MARTY BEAVEN

PC Contact

THIS MONTH'S FREE SOFTWARE All the public-domain and shareware programs, batch files, and utilities featured in PC/Computing each month are available on our online service, PC/Contact, or on disk from Public Brand Software for a fee. Here's a sampling of the programs you'll find this month.

Check Windows Speed with WindsockHelp, page 340

Is your system running slowly? Trying to see if that new video card is as fast as they claim? Download two Windows utilities that provide a wealth of information about your Windows setup. Windows reports your processor type, memory size, available memory, and swap-file size—and measures CPU, disk, and video performance. Windows K8M reports available system resources and raises an alarm if any of your system resources drops below a specified level. Both utilities can be found in data library 3 (Utilities/Mis.) in the file WINSOK.EXE.

reamy campien of unimatuois of Dos 5 nates language 1 ry out trivat Associates STACKEY and BATUTIL. Using the keyboard buffer, STACKEY pumps keystrokes into batch files—enabling you to perform such batch acrobatics as running a program, loading a file, printing it, and quitting the program, all in one command. Furthermore, the program can send files to the printer and reboot in a batch routine. BATUTIL adds sound to your batch routines, and enables them to pause and accept in-put from the command line. Together, these two files will pump up your batch files to professional strength. Download SECYAREEE from data library 3 (Ulifise Misc.).

The CompuServe and ZiffNet environments can sometimes be intimidating, and the basis, ment-driven interface doesn't help much. Practice getting around and learn to make the most foyur online follains by using the PHACTICE forum. This forum worst like the others on CIS. From any forum prompt, type GO CISPRACTICE, and you'll be able to leave measages and downdard files. Best of all, it's free!

HOW TO JOIN PC/CONTACT

For conent CompuServe subscribers, just type 60 PCCONTACT to access the forum. Cost is based on CIS's fee of \$12.80 per hour for 7.00 yet por 400 per port for 9.000 per hour for of 0.000 per hour for 0.0

For new subscribers, follow these steas:

- 1. Set the following parameters within your communications program: 7 data bits, even posity, 1 stop bit, and full duplex.
- 2. Cell CompuServe's tribfine Customer Assistance Line or (800) 848-8990 (Ushind Stores) or (800) 635-6225 (Conodo), From other countries, dial CompuServe direct or (619) 457-8650. A vice-response system will ook you if you wont o local-access number. Then you'll be closed to entire you Tabore number and the speed of which you wont to occess the system. CompuServe reads bock the local number word law to occess the system.
 - Or, call CompuServe with your modern. Set up your modern and felecommunications package using 7 data bits, even parity, 1 step bit, and full duples, and call duples, and call duples, and call duples, and call duples and call follows the oscient ensures of more than 6 feles, then bit filter, then just follows the oscient ensures and not the oscies phone number for your ones.
- 3. Glot the locoFoccess number with a modern. When you cannect to the network, press CtrFC to get its attention.
- 4. At the HOST NAME prompt, type CIS (which is the occorvin of the CompuServe Information Service).
- S. At the USER IO prompt, enter 177000,5300.
- 6. At the PASSWORD prompt, enter PC/CONTACT,
- 7. At the ENTER AGREEMENT NUMBER prompt, type Z100PCC1.
- 8. If you have trouble, call the Customer Assistance Line or (800) 848-8990. After you follow the charse procedures, the CS system will provide you with your own user 10—collect of PPH—and a temporary possword. You can then log an and begin to explore PC/Centect. In about two weeks, you'll receive a letter from CIS confirming your PPP and providing you with a new possword. You should then change your possword by playing 60 PSCSVOROR or any CIS prompt.

TOP PICKS ON DISK

You can easily get all the public-domain utilities or showevore covered in this manth's issue by calling the disk vendor Public Brand Software of 18000 446-6476, (317) 185-67511. Ask for this month's Editors Picks from PC/Computing, They're available for \$5 or less per disk from disk kinds were will faller and or public per and the state of the state of

CComputing

COMING SOON

Let Windows Rip

Love Windows, but hate how it slows down your system? And has the price of cards that relieve the video bottleneck held you back? Local-bus video accelerates performance at minimal cost. We check out some of the fastest systems available.

Tax-Preparation Help

It's that time of year—again. Because tax-preparation soft-ware is upgraded annually to reflect new tax laws, there's a dilemma each year: should you stick with your current program or switch to a new one? We pit the two premier Windows programs, TaxCut and TurboTax, against each other to help you get a better return.

Master Your Network

A local area network in the office solves many problems but can introduce others. We've compiled dozens of tips that eradicate some of the most common glitches and extend the usefulness of your network.

In-Depth Chip Guide

It's hard to keep track of all the chips out there. What's the difference between an AMD 386DX/40 and an Intel 486SX/ 16? Our guide sorts out the spees and explains the practical implications of choosing a particular chip.

Plus...the ultimate tape backup, part two of Bill Gates's biography, and advanced batch file programming techniques.

Software Secrets

EXPERT ADVICE TO HELP YOU TAP THE HIDDEN RESOURCES OF POPULAR APPLICATIONS AND UTILITIES

1-2-3

MACRO PARTS TESTER

Test your macros as you write themeven before you reach for /Range, Name, Create to name them. Just press Alt-F3 (Run), and specify the cell in which you want 12-3 to begin running commands. Use this key to test large macros section by section to Copy the part you want to test into an empty area of your spreadsheet, then use Alt-F3 to run that section to the section of the command of the comma

MOIRA MOYNIHAN TOLEDO, OHIO

UPDATE LINKS EFFICIENTLY

1-2-3 3.0 allows you to link data in one worksheet with data in another worksheet. If both files are visible on your screen, just click on a cell in the source file to copy that cell's address into the current cell of the current worksheet.

To save time when you're working with linked files, you should always open source files before you open the worksheets that refer to them. If you don't open source files first, it can take a long time to update your worksheet data links. If it still takes a long time, set recalculation to Manual (choose Worksheet, Global, Recale, Manual).

LARRY FREEMAN
SAN MATEO, CAUFORNIA

A BETTER PAGE BREAK

When you use /Worksheet, Page to insert a page break, 1-2-3 inserts a blank row and puts the symbol |:: (a pipe followed by two colons) in the leftmost cell of that row. To make 1-2-3 print a page break without inserting a blank row, go to the row where you want the page to break and type |:: in the leftmost cell of the range you're printing.

MARTIN PALMER TRENTON, NEW JERSEY

QUATTRO PRO

SOUP UP THE SPEEDBAR

Don't be limited to Borland's default SpeedBar configuration. To change your SpeedBar buttons, choose /Options, SpeedBar, and select whichever SpeedBar button you want to change. Select a button to change, then choose Macro to change the macro that runs when you click on that button. Then choose Short Name to change the button's label.

If you want to use a name that's

shorter than three characters (such as C for the Copy button), add spaces after it so that the label is no fewer than three characters long. Otherwise, the button will be too small to click on easily

JOSEF GLASER MISSOULA, MONTANA

REMOVE UNWANTED ROWS

One of the most common uses for the Del SpeedBar button is to delete a whole row. However, it saves you only

///**Pro Tips: Spreadsheets** /////

LARGE-MACRO WRITING MADE (RELATIVELY) SIMPLE

I'M WRITING A LARGE INVENTORY-MANAGEMENT SPREADSHEET FOR MY COM-PANY, I END UP WITH A LOT OF BUGS, AND THE SPREADSHEET'S CRYPTIC ERROR MESSAGES DON'T ALWAYS HELP SOLVE THE PROBLEMS. HOW DO PROS DEBUG SPREADSHEET MACROS?

MATTHEW GRANT

Your best weapon in the wor against bugs is to write your key morro procedures as standdaine subroutines. Test each subroutine independently of the others, and them together with a list of subroutine calls. If you ensure that a shart routine was before you tie it into a longer morro, you wan't waste time reviewing the routine's steeps should the mocro foil loter on.

When subroutines foil, reading error mesoges—however cryptic—is the first step in straighening things out. Look for key phroses in the mesoges. The stolement "Involid ronge . . ." means your mootro refers to or range name that doesn't exist in the spreadsheet. "Unrecognized key/fonge name" means there's something in the mootro that looks like a mootro command but list?

Mony error messages identify the spreadsheet cell that contains the problem cade, immediately examine the contents of hot cell to determine whot you mistyped. When the error message doesn't identify on offending line of code, read through the motor until you find a sequence of cammonds that doesn't make sense. For keystroke motros, monoully perform the keystrokes accordad in the motor on adobserve the effects on the sheet. Print the motor or on of baserve the effects on the sheet. Print the motor or on of the strength of the sheet is the strength of the motor of the sheet. Print the motor or on dead from the printate stop was one set the motor of the strength of

When error messages don't help, there ore two ways to go: Monually step through the routine or use Site pmode. In the first method, split the display into two windows (Modrokshenk, Windows, Horizontol In 12-23; Windows, Options, Horizontal in Quottro Pro), and unsynchronize them [/Workshenk, Windows, Insynch in 12-33; Windows, Options, Unsynch in Quottro Pro]. Then display several lines of mocro code in the lower window, activate the unswer window, activate the work of the wore of the work of

The second method, Siep mode, tokes some of the badium out of pinpointing where your mocro code foils. To activote Step mode, press AHF2, In 1.2-3 Releass 3x, see leaf Siep from the resulting menu; in Quotro Pro, select Debugger, Yes from the menus. When you run a mocro, the mocro processor pouses before each command. Press o key, and the processor executes the next commond and pouses again. In 1.2-3 2 and Quotro Pro, a trace window reveals pending macro steps so that you can see which command the mocro is obout to process. In 12-3 3 x, follow the action with a printout of the mocra to determine which step causes the mocra to fail. Press AHF2 o second lime to descrivine Size mode.

Janiei Gasteioer

SELF ACTUALIZATION MEMORY OPTIMIZATION REMOTE CONTROL DATA RECOVERY ANTI-VIRUS ~ BACKUP DESKTOP SEX~COMPANIONSHIP SHELTER ~ SAFETY FOOD~WATER

fig. [1] Maslow's Hierarchy of Needs.



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Software Secrets

three keystrokes, and you still need to press Enter twice. To make Del an efficient row remover, edit the macro that the button runs. Press /Options, SpeedBar, select the Ready mode SpeedBar, and select the Del button. Then choose Macro, and add two tildes (~~) to the end of the macro. Now when you click on Del, Quattro Pro will remove the current row. If you want to delete columns or blocks of cells, use Edit, Delete.

MARK COLEN APTOS, CALIFORNIA

FIND FILES FASTER

Don't waste time paging through long directory listings to find the file you need. Instead, press F2 (Search), then the first letter of the file or directory you're looking for. You'll jump to the first file or directory whose name begins with that letter. Type a second letter to narrow the search. This also works with the Goto command (F5) when you're looking for a range within a long list of named ranges. Press F5, then F3, F3 to see a full-screen listing of all named ranges. Then press F2, followed by the first letter of the range volume.

RICHARD D. HOLLIDAY

TALLY THE TIME

To calculate the difference between two times, type the beginning time in A1 and the end time in B1 and use the following formula:

(@TIMEVALUE(B1)-@TIMEVALUE(A1))/ Ø.041666667

You must enter the times in A1 and B1 as labels by preceding them with a single quote. The formula gives you the time difference as a decimal number, which you can use to figure wages, expenses, and so forth. For example, if A1 contains '8:30 and B1 contains '11:45, the formula will return the value 3.25.

ROBERT G. WARNER CARY, NORTH CAROLINA

WORDPERFECT

BLOCK AND BLOCK AGAIN

When you need to make several formatting changes at once to a single text block, it's annoying to have to reselect the block after each change. To make this task easier, use Word-Perfect's block-re-selection feature. First select the block that you want to change: Press Alt-F4 (Block), and move the cursor to highlight the entire block. Then press the key that denotes the first attribute you want to apply, such as F6 (Bold). To reselect the block for the next formatting change, press Alt-F4. Ctrl-Home.

/// Pro Tips: Word Processing ///

CREATE HYPERTEXT BUTTONS IN WORDPERFECT

WE KEEP OUR COMPANY'S PHONE DIRECTORY AND PRODUCT CATALOGS IN LARGE WORDPERFECT DOCUMENTS. WE USE THE SEARCH FUNCTION TO LOCATE SUBSECTIONS OF THE DIRECTORY AND CATALOGS, BUT IT WOULD BE QUICKER AND EASIER IF WE COULD SIMPLY PRESS A KEY TO JUMP FROM THE TABLE OF CONTENTS TO ANY SECTION OF TEXT. CAN WE DO THIS WITH A MACRO?

GERRY ROBERT

It's foirly simple. You insert into your table of contents hypertext buttons that WordPerfect will read into a search string when you press a mocro key.

To ensure that the macro works consistently, make your toble of contents entries exactly motch the section files, and place each entry on a line by tistelf. To prevent the
Search function from stopping of secondary occurrences of the search text (and to
mork table of contents entries or hypertext buttons), we nomes with unique character
combinations—>>ACCOUNTING or >>WIDGETS, for example. These nomes should
oppear only in the table of contents and in the corresponding section titles.

oppear only in the toble of contents and in the corresponding section titles. Then create a morce that blocks the line of the curvar, copies the blocked test into a varioble, and locates test that mothes the contents of the varioble. First, create the structure of the morce using Moorce Def. Type a variot on a line by Island; then Press FI-FIO (Moorce Def), At the Define mocro: prompt, press the key you want to use for hypertest jumps, such as AIIG for "Go to." Type a morce description, and press Enter. Perss Hame, left arrow to move the cursor to the left end of the line. Press FI 2 or AIIF4 (Block), Hame, right arrow to block the line. To assign the contents of the block to varioble 1, press CH-Plage UP (Moorc Omenda), 3 (Assign), 1. Enter. Press F2 (Search), and then press CH-F10 (Moorc Def) to turn off the mocro recorder. Finally, press F7 to concell the search.

WordParfect won't let you insert the contents of o vorioble of the Srch: prompt, so use the mocro editor for the remoining steps. Press CHF 10, Alt-S, 2 (Edit) to disploy the mocro you just recorded in the editing screen. Nove the cursor to the right of the (Secrch) command and press Crth-Poge Up to disploy the mocro command list. Press V to move the highlight to the (VARIABLE) command, and press Enter to insert the command in the mocro. Type 1 - to the right of the (VARIABLE) code. This inserts the contents of varioble 1 in the soorch string. Then press F2 (Seorch) to insert a second (Seorch) command.

As the lost step, place a command of the beginning of the macro to clear varioble 1. This isn't strictly required, but it's a good hobit to develop, as it prevents the macro from picking up varioble contents left over from other macross. Move the cursor to the right of the (DSRLAY OFF) command of the beginning of the morro. Press CHF-Page Up to display the mocro commands window, select the ASSIGN command, and press free. Move the cursor to the right of the (ASSIGN) code and type 1---. This clears the contents of varioble 1. The macros should now look like this:

{DISPLAY OFF}{ASSIGN}1~ {Home}{Left}{Block}{Home}{Right}{Macro Commands}31{Enter}{Search}{VARIABLE}1~{Search}

Press F7 (Exit) to leave the macro editor. To use the macro, move the cursor to a table of contents line and press AIrG. The macro will jump to the next occurrence of the table of contents entry—which will be the corresponding section title.

George Belnhorn



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City	State	Zlp

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three keystrokes, and you still need to press Enter twice. To make Del an efficient row remover, edit the macro that the button runs, Press /Options, SpeedBar, select the Ready mode SpeedBar, and select the Del button. Then choose Macro, and add two tildes (~~) to the end of the macro. Now when you click on Del, Quattro Pro will remove the current row. If you want to delete columns or blocks of cells, use /Edit, Delete.

MARK COLEN APTOS CALIFORNIA

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Tips: Word Processin

CREATE HYPERTEXT BUTTONS IN WORDPERFECT

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Then create a macro that blocks the line at the cursar, copies the blocked text into a

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Software Secrets

Ctrl-Home, then press the formatting key you want for the next attribute, such as F8 (Underline).

BRADLEY C. HENSKE TYLER, TEXAS

WODDERFECT FOR THE FAMILY

If several people use WordPerfect on your PC, you can set it up so that each person has a separate configuration, with personal colors, printers, default directories, and so forth. Simply set up WordPerfect as a network installation, even though it's running on only con meebing.

At the DOS prompt, switch to your WordPerfect directory, type IN-STALL, and press Enter. Answer Yes to continue with installation and Yes to install to a hard disk, Select 3 (Network), and enter the path to your WordPerfect directory on the Install Files From; and Install Files To; lines. Then choose 5 (Check WP{WP},ENV), and type 0 (Other), WordPerfect will then prompt you for a directory for your setup files. To keep your Word-Perfect directory from getting too cluttered, specify a separate configuration subdirectory. If one doesn't already exist. Install will create it for you, Finally, select 7 (Exit) to leave the Install program.

When you run WordPerfeet, the program prompts you to enter a three-letter user name. If a profile for this name exists, WordPerfect uses that profile. If it doesn't, the program will create a new configuration file. WordPerfect saves any changes you make to the default configuration in setup files named WPABC). SET (for user ABC), WPRED). SET (for user ABC), and so on. The "network" installation won't use up any extra disk space other than what's needed for these files.

MICHAEL R. CRAIG LOVELAND, COLORADO

DINGRAT REFERENCE CHART

Create a dingbat reference chart quickly and easily with WordPerfect's CHARMAP.TST. Open this document, which should be in your WordPerfect directory. Locate Character Map 12, then press Shift-F8 (Format), 3 (Document), 3 (Initial Fond) to change the default font for this document to Zapf Dingbats. Then print the page containing Character Map 12, and you'll have your reference grid. When you're done, exit this document without saving your changes.

ALLYN BROSZ WASHINGTON, D.C.

MICROSOFT WORD

TAME YOUR DATA FILES

To make mail-merge data files easier to edit and to check for errors, arrange the fields vertically, rather than horizontally, on your screen. To convert a tab-delimited file to a vertical file, first move to the top of the data file, then replace the tabs with both tabs and new line characters. Press Esc, R, type ^ t (the tab character) after the Replace text: prompt, and type ^ t ^ n (tab and new line) after the With text; prompt. Select No under Confirm; and press Enter to rearrange your fields.

Next, split the screen vertically so that the field headers are visible on the left. Press Esc, Window, Split, Vertical; type 15; and press Enter. It's now a simple matter to line up data fields with the headers on the left so that you can verify that the data is in the correct format.

When you're done editing, return the data file to ordinary tab-delimited format. Move to the top of the document, and choose Esc, Replace to replace ^t^n with ^t.

WILLIAM S. J. MOORHEAD IOWA CITY, IOWA

EVEN COLUMNS

The last page of a multiple-column document should have the same number of columns as the other pages, and each column should be the same length. To make your last page look like this in Microsoft Word 5.0, press Ctrl-Enter to create a new division at the end of the document and position the cursor in the new division. Format this division's layout as a single column, and choose the Continuous option in the Division Break field (Esc. Format, Division, Layout). Enter 1 for number of columns, and select Continuous from the Division Break options. Your last page will have the same number of columns as the rest of the document, and its columns will have the same length.

GERARDO S. ESGUERRA LOS BAÑOS, PHILIPPINES

WODDSTAD

CHANGE THE LEADER CHARACTER

If you're tired of the same old dot leaders, use WSCHANGE to select, of different leader character. From the main menu of WSCHANGE, select option D (WordStar). Then choose B (Editing Settings), F (Lines and Characters), and I (Dot Leader Character). Enter the new character, such as a hyphen, and press X to return to the main menu. Save the changes before you return to DOS. The next time you run WordStar, you'll have a new leader character.

ED QUILLEN SALIDA, COLORADO

ASCII NO QUESTIONS

The usual way to type characters in the extended ASCII character set is to hold down the Alt key and type a character code on the keypad. For instance, to create the fraction ½, hold down the Alt key, type 171 on the keypad, then release the Alt key, The problem is remembering those obscure three-digit codes. The solution? Type Ctrl-P, of or a list of the codes.

If you frequently use certain extended characters, save time by assigning them to macros with intuitive hotkeys. For instance, use Alt-2 for 4 (character 172). If you're old enough to remember real typewriters, Alt-6 is a good key for e (character 155), because the cent sign was a shifted 6 on many typewriters. Your fingers probally remember, even if you don't.

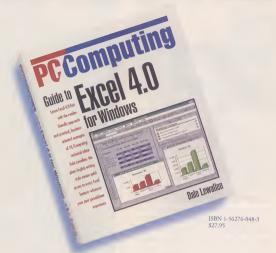
ED QUILLEN SALIDA, COLORADO

PARADOX

ANSWER TABLE REPORTS

Make your query results easier to read—print them to a report. But bear in mind that Paradox doesn't save reports attached to the Answer table. If you need to create reports from the Answer table often, save them in a separate data table and copy

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serious than others. computers.

Software Recrets

them to the Answer table whenever

To design the form, choose Report, Design, and select the table that you query. Then choose an unused report number, name the report, choose whether you want a tabular or freeform report, and lay out the report as you like. Press F2 to save the report.

When you perform a query on this data table, be sure that all fields are checked, or you won't be able to use the form you designed. Once the query is complete, select Tools, Copy, Report to copy your report to the Answer table. Select DifferentTable, specify your data table as the source, and select the report you designed. Specify Answer as the target table, and press I to make the report you're conving report No. I.

Now print the Answer table using the report. Select Report, Output, Answer, choose report No. 1, and choose Printer

JACK C. HILL TEMPLETON, PENNSYLVANIA

DBASE

KEEP TRACK OF SERIAL NUMBERS

Make your dBASE application assign as serial number to every new record so that each record has a unique identifier. To do so, keep track of the last serial number you assigned by using a memory variable that you save on disk. Go to the dot prompt, and put the initial serial number in this variable to the you save on disk. For four-digit serial number into starting at 1000, type STORE 1000 TO SERIALNO. To save this variable to disk, type SAVE TO NEXT, BLASE saves the variable on disk in a file called NEXTMEM.

Your application can now use this saved memory variable when it needs to assign a new serial number. The following four lines take the number that's saved in NEXT.MEM and put it in the alphanumeric field SERIAL.

RESTORE FROM NEXT ADDITIVE REPLACE SERIAL WITH STR (SERIALNO,4) STORE SERIALNO + 1 TO SERIALNO SAVE ALL, LIKE SERIALNO* TO NEXT

> ED KEIM DILLSBURG, PENNSYLVANIA

FIT MORE INTO REPORTS

You're not limited to one record per line in reports that you create with the Assistant's report-creation utility. When setting up a column, use a semi-colon to put additional character fields from the same record on a new line. Use TRIM() to remove extra spaces.

from these character fields, and use + to add fields together or to include additional characters in the record.

For example, the following expressions organize the data in the fields NAME, SEX, ADDRESS1, ADDRESS2, CITY, STATE, and ZIP so that it's more readable.

/// **Pro lips:** Databases //////

KEEP DRASE AND 1-2-3 RECORDS IN SYNC WITH UPDATE

WE KEEP TRACK OF OUR CONSULTING WORK BY ENTERING DATA INTO LOTUS 1-2-3 AND USING BASEY'S APPEND COMMAND 10 ADD THE INFORMATION INTO A MASTER DATABASE. WE CALL EACH RECORD IN THE DATABASE A GREEN SHEFT, AND EACH HAS A UNIQUE NUMBER ASSIGNED TO IT. THE PROBLEM COMES WHEN WE UPDATE OUR RECORDS IN 1-2-3 AND PULL THE DATA BACK INTO DASSE—WE END UP WITH DUPLICATE RECORDS, IS THERE A WAY TO TRANSLATE AND REPLACE RECORDS AT THE SAME TIME?

JANIS AND ROBERT ROSE

Instead of adding records to your database and deleting the duplicates, use diAASE's UPDATE cammand at madify the contents of one database with information from a see and. Let's assume that you have a database of Green Sheets called Green that has three fields; Job, Hours, and Lot, date. During the week, use your spreachteet to update the number of hours warked and the transaction date; then translate the file into a second database called Gtrans, which also has three fields; Job, Wark_hrs, and Tran, date.

Next, apen dBASE ta perfarm the update. To da this, use the following command file to update Green with Gtrans:

SELECT 2 USE Gtrans SELECT 1 USE Green INDEX ON Job to GJOB USE Green INDEX GJOB UPDATE ON Job FROM G

UPDATE ON Job FROM Gtrans REPLACE Hours WITH Hours+B- >Work_hrs,
Last_date WITH B->Tran_date Random

This routine opens the transaction database. Gtrans. in work area 2 and the master

database, Green, in work area 1. The INDEX command sorts the database on the IOB field and places the results into GIOB, which is then apened as a new database. Next, the UPDATE command matches each transaction in Girans to a recard in Green. Once it finds a recard, dBASE adds the hours warked from Girans to the total hours in Green. It also replaces the last transaction date with the date in the Girans transaction recard, if the date dasen't change, dBASE wan't touch it, thereby leaving the integrity of the date into LUPDATE requires the target database—in this case, Green—to be sorted an a field camman to both databases, but the Randam parameter in effect loasens dBASE's restriction that both files must be sorted in ascending arder an the key field.

By the way, you can eliminate most of this work if you're willing to cansider using a different spreadsheet. Quattre Pra reads and writes 1.2.3 and #BASE files. Instead of modifying a spreadsheet and translating the data inta #BASE format, you can use Quattre to retrieve the dotobase directly. Quattre stores the records as columns of information, one column per field, and places the field annee at the top of the appropriate column. Enter changes to the fields, then simply save the database with 0 Fifle Save command.

Mike Falkner

Software Secrets

Column 1: TRIM(NAME)+' ['+SEX+'] Column 2:

TRIM(ADDRESS1):TRIM(ADDRESS2) Column 3: CITY:STATF+' '+7IP

The report will print records like this: John Doe [M] 10 Fast, St., Reno

Apt., 123 NV 89507 You can use other string-manipula-

tion commands, like LEFT(), to pare down data to what you want to see. BRIAN HOBBS

CHERRY HILL. NEW JERSEY

A&O

KEEP FIELD VALUES UNIQUE

To ensure that values in a field are unique, use the Format Spec SII (Speedy Unique), If you enter a value that is used in another record. Q&A displays the message "This field should be unique. Please verify before continuing." But you can press Enter to make Q&A accept the value.

For greater security against duplicates, use an external file lookup. From the main menu, select File, Design File, Program a File, and specify a database file (EMPLOYEE below). Select Program Form, go to the field you want to check-here, ID Number-and press F6 to enter a program. Then type

>#1: TE

@XLOOKUP("EMPLOYEE",#1,"ID Number", "ID Number") <> "" THEN BEGIN @MSG("This ID Number Already Exists."):GOTO #1: FND

Press F10, then return to the main menu. You won't be able to press Enter or Tab to move to another field unless the ID Number value is unique.

FARHAD HOMAYOUNPOUR GRAND PRAIRIE, TEXAS

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Hardware Hints

TIPS AND TECHNIQUES TO BRING OUT THE BEST PERFORMANCE IN YOUR PC AND PERIPHERALS

MODEMS

END ONSCREEN GARBAGE

If you log on to a bulletin board or online service and get a screenful of garbage, the first step in trouble-shooting is to ensure that the communications settings for parity, data bits, and stop bits are correct: N.S.I. (no parity, 8 data bits, 1 stop bit is very common, but E.7.I is another possibility. Then make sure that your moder and the BBS are operating at the same speed.

If the problem persists, you could have an interrupt problem. COM1 and COM3 share IRQ4; COM2 and COM4 are at IRQ3.

If your modem is hooked to COM2, change the setting temporarily to COM1 (change your communications software as well) to see whether another device is using IRQ3. If the online session works, examine the switch and jumper settings on the other boards in your system to determine which one is using IRQ3. Once you locate the board, assign it a different IRQ setting. If you can't find any other boards set for IRQ3, the problem may well be a bad universal asynchronous receiver/transmitter (UART) chip.

DALE LEWALLEN TECHNICAL EDITOR

STORAGE MEDIA

PARKING THE HARD DISK

Most newer hard drives, especially those that use a voice coil to position the heads, automatically park their heads when the power is cut off. Parking the heads involves moving letter and them away from tracks on the disk that contain magnetic data and into a zone close to the center of the disk. It's worth checking whether your hard disk is one of these or whether you need to use a utility to park your heads, because moving your PC and even turning it off can be hazardous if heads such a parked.

Conventional wisdom says you only need to park the heads of the hard disk before you move your PC, since that's when they are most likely to be jostled and damaged. But when a hard drive is powered up, electric current escaping from, the head amplifier turns into a magnetic impulse that some believe can harm the data underneath. Also, after years of use, the heads may retain a magnetic charge, which could cause the stepper motor armature to jerk sideways slightly when power is applied. Since the heads rest against the drive surface when the drive is off, the surface can

be damaged if the heads aren't parked before power-down.

> BILL FIELDS PHILADELPHIA, PENNSYLVANIA

LET LOW-CAPACITY DISKS ALONE

Low-capacity floppy disks that came with DOS 2.0 or Windows/286 should be good for years of service—but don't try to push their capacity. Punching additional holes in 3½-inch cases and formatting disks beyond their capacity seems like an easy way to gain an extra 700K of storage and may work for a while, but it's risky. Though both sides of the mylar disk are coated with magnetic media, the coverage may be uneven on the dark

//Hardware Checklist ///

CARE AND FEEDING OF YOUR RODENT

Sooner or later, your mause cursor will start to behave errotically, jerking around instead of maving smoothly. This is almost always because the mouse boll has picked up dirt. Here's a regime that will keep your rodent working smoothly.

Treat your mouse to its own pad. Most dasks ore contal with of his layer of dir, greene, polish, and dust, and don't offer good traction far your mouse's roller boll. A mouse pod is the obvious onswer, whether it's coated with a mouse pod is better like on old wet suit or it has a shirry surface. But like dasks, shiny-surfaced mouse pods age tigning, so you should occosionally closen yours with wother or a detergent dastigned for fine woshobles. Moke sure to rinse all the detergent out of the pad, since only residue will gum up the mouse boll and mouse guide rollers. And make sure it's obsolutely dry before you use it aopin.

Clean the roller ball. Shut down your computer and disconnect the mause. Turn it upside down and twist the retolning plate counterclackwise (or with some brands of mouse, slide the retaining plate down). Tip the mause right side up and the rubber ball will foll out. Draw your thumb across the ball; if grimy tracks oppear, it needs a thorough wooking. Using top water with a little mild detergent, scrub the ball claim, then rinse it in plenty of dear worker. Most important of all, allow several hours for the ball to dry before reassembling the mouse. If you have a scaled to fistic gel from any of your hordware packaging, rest the ball on it to obsorb the moisture.

Clean the rollers. While the boll dries, blow oir through the roller covity to lassen dust—use a can of compressed oir (ovoiloble ot comero stares) if you have one—then examine the plastic rollers for grime. With the mouse still unplugged, gently swob the rollers with a Q-Tip diagoal in denotived alcohol to remove the subbbarra grime.

Put it back together. Before popping the mouse boll back into its covity, moke sure it's dry and free of lint, and that the covity contains no strands of cottan from the swabs. Blow it out once more for good measure.

AGOURA HILLS, CALIFORNIA



"THE ENVELOPE, PLEASE..."

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PHILADELPHIA, PENNSYLVANIA

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Hardware Hints

side—and you won't know until the bad clusters start showing up.

MATHEW LAKE
ASSOCIATE FRITOR

DON'T OVERHEAT YOUR DO

Heat is a real enemy of your PC. Too much heat will ultimately lead to the failure of your motherboard, expansion cards, and hard drive. But most insidious of all are the intermittent problems it causes. A few simple step will keep your PC cool. First, keep it out of direct sunlight—CPUs generate enough heat without any help. Next, keep tower systems—especially the fan vent—away from heating vents and clear of obstructions. Keep the area within six inches of your systems—specially the control of the control

tem clear of junk. Stacks of papers can be especially harmful.

PRINTERS

POSTSCRIPT PAPER SAVER

To prevent your PostScript printer from generating a test page every time you power up, check the printer's driver disks for a utility that turns this feature off. If there isn't one, create a PostScript command that does it for you. In a text processor, enter the two pieces of code listed below and ave them in separate files called TEST_OFF.PS and TEST_ON.PS. To turn off the test page, enter this line or create a batch file containing it:

TYPE TEST OFF.PS > LPT1

Substitute another LPT port if your PostScript printer isn't attached to LPT1. You'll receive the message "existserver: permanent state may be changed," which shows the command worked. Next time you power up the printer, you won't get the test sheet. To turn the feature back on, send TEST_ON.PS to the printer using the same technique.

ALAN WALKER LOS ALTOS, CALIFORNIA

TEST OFF.PS

serverdict begin Ø exitserver statusdict begin false setdostartpage end

TEST_ON.PS

serverdict begin Ø exitserver statusdict begin true setdostartpage end

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How it Works

Infrared LANs

LINKING PCS WITH INVISIBLE LIGHT WAVES, NOT WIRES.

BY JOHN TASCHEK * ILLUSTRATION BY TIMOTHY EDWARD DOWNS

When installing LAN cables is impractical, wireless networking is the obviaus answer. The least expensive medium uses infrared waves to connect PCs through remote-cantrol devices.

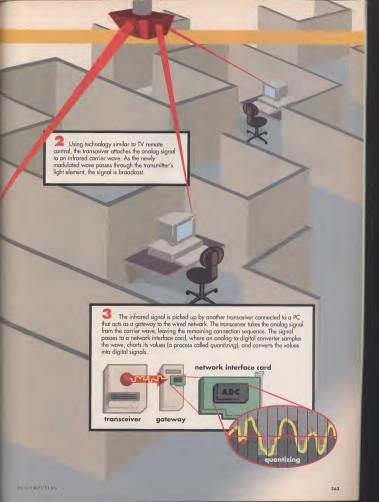
This system attaches its signals to waves on the electromagnetic spectrum—just like signals along twisted pair and coaxial cables, but at much higher frequencies.

When you log on to a network using infrared technology, software drivers and a special network interface card translate the LAN connection sequence. A digital-to-analog drip in the interface card convents the PC's digital signal to analogs waves that pass to an infrared transceiver (fransmitter/receiver).



4 The LAN gateway then passes the signal to the network server, which responds with regular network protocal signals. These signals return to the LAN node, establishing a circle of network communication that continues as long as the node is connected.





AUTHORITATIVE ANSWERS TO YOUR MOST PRESSING PC. QUESTIONS, BY DALE LEWALLEN AND JEFF PROSISE

No Numbers, Please

The SHIFMOD.COM utility that you printed in the September 1992 issue ("May Challenge Solved," page 336) was great, It'd like to page 336) was great, It'd like to the Shift key, I always use the numeric keypad for entering numbers, so It'd like to have the top row of number keys permanently shifted. That way, whenever I press the 5 key, for example, I'd get a percent sign, regarders sign, regarders. It is not so that the shifted. That way whenever I press the 5 key, for example, I'd get a percent sign, regarders.

MARK KAYE NIAGARA FALLS, NEW YORK

It's possible, and here's the DEBUG script that makes it so. This script creates a short utility called NO-NUMS.COM that causes keys 1 through 0 on the top row of the keyboard to behave a sif they were permanently shifted.

To create NONUMS.COM directly, use any text editor that creates plain ASCII files. Copy the following commands exactly as they are printed, and save the file under the name NONUMS.CCR

N NONUMS.COM

RCX 66 W

W Q

It's important that you press Enter after the end of the final Q, or else DEBUG will choke during the next procedure. Make sure that the directory containing DEBUG (usually your DOS directory) is in the DOS search

path. Then type the following com-

DEBUG < NONLIMS.SCR

This creates a program file called NONUMS.COM. To use it, type NONUMS at the DOS command prompt or add the command to your AUTO-EXEC.BAT file. NONUMS works with most application programs, but it will not work with programs that take control of interrupt 09h and enact their own key-processing logic. One notable program that falls into this

category is Windows. As we have pointed out in previous columns, Windows handles all of its own keyboard tasks, so it's a bit more difficult to get under the hood and tinker with it.

If you have a modem and a CompuServe account, you can download NONIMS.COM (both the executable program and the DEBUG script) from PCContact, PC/Computing's online forum. Look for the file NONUMS.ZIP in data library 1 (Hot Tips/Secreta). If you don't have a CompuServe account but would like to download this and other PC/Computing programs, see the information panel on page 343 for more information on how to participate.

HELP ABOUT DELAYED-WRITE CACHES

I'VE BEEN INVESTIGATING CACHE SOFTWARE FOR MY DISK AND I KEEP COMING ACROSS THE TERM STAGED WRITES, WHAT DOES THIS MEAN AND HOW DOES IT

AFFECT PERFORMANCE?

SUSAN ROCKE

As you know by naw, a disk cache helps speed up your disk by watching over the stream of data between the CPU and the hard disk. When the CPU request data from the hard disk, the acche grabs a capy of the data and stares it in the coche. The next time the CPU needs that data, the cache can fulfill the request from cache memory, rather than having to go book to the sleware disk drive for the information. Many caching pragrams—including Windows' SmortDrive—have a feature called staged writes, Jais referred to as delayed writes a rular yerites. The term means that the cache will also intercept data that the CPU is trying to write to the disk. The cache software facilit the CPU into thinking flat data has been written to the disk and frees it up to continue its next task. When a certain amount of data is in the cache, or when a certain amount of time elopses, the data is written to the physical disk in a batthma-

Mast cache programs that include deleyad writes also include a way to turn diff that feature, to address same people's feats about threats to data—such as a power outage accurring befare all cached data is written to alsk. In reality, since caching times are minimal (a few seconds of most) and power supplies are usually stable, this is a feature mast seadle wort chaose to use.









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Call 800-562-0311 today, and we'll tell you where to catch a demonstration of the new UC840. (Feel free to bring along your dinner date.)



CD-ROM and WinWord Tussle

I've uncovered what I believe is an incompatibility between Windows 3.1 and CD-ROM drives. When I select Open or Save As from the File menu of Word for Windows 2.0 and an audio CD is playing in my PC's CD-ROM drive, the CD stops. The conflict seems harmless, because after opening or saving the file Lan restart the CD and continue working. But It's annoying nonetheless, Have you heard of this problem, and is there a five 2.

THOMAS CUSHMAN LAKE CHARLES, LOUISIANA

The problem isn't in Windows; it's in Word for Windows. Version 2.0 contains a bug that halts an audio CD when certain menu items are selected. The bug has been fixed in an interim release of Word for Windows called Version 2.0B, which became available last year. To get your free update, call Microsoft Product Support at (800) 426-9400 or (200) 462-9673.

How Does a Cache Work?

I have a 64K cache on my system. I am told that this is a special storage area that selects specific inage area that selects specific information from my hard disk and formation form my hard disk and
sets it aside where it is more readily available for use. If a my
readily available for use, and as
spreadsheet, is the word processor and start in
spreadsheet, is the word processor in the cache replaced with the
spreadsheet program? How does
the cache know what to keep and
what to release?

DICK FRENCH CASPER, WYOMING

It sounds as if you might be confusing a disk cache with a RAM cache. The 64K cache in your PC is probably a RAM cache is similar to a disk cache except that it stores data traveling to and from memory rather than to and from disk. RAM caches are typically composed of static RAM, which is sebstantially faster than the dynamic RAM installed in most 386 and 486 PCs. A well-designed RAM cache can increase the performance of a 386 or 486 by 20 percent or more by eliminating time-consuming wait states—

idle time the CPU spends waiting for a unit of data to be read from or written to a location in RAM.

A disk cache, on the other hand, is an area of memory where the system caches data going to and from a disk drive. So if information that was recently read from the disk is needed again it can be retrieved more quickly from the cache than from the drive itself. A disk cache works more or less as you have described it. Note that the cache controller has no concept of word processors or spreadsheets. It works at a much lower level. understanding only bits and bytes, So instead of holding the entire word processing program in memory, a cache might retain parts of the word processor, parts of the document files. and even parts of the spreadsheet, all depending on the size of the cache and your system-usage patterns.

How does your PC determine what to keep in the RAM cache? The logic depends on the type of cache controller used to implement the RAM cache, but it's usually pretty simple. The cache controller sits between the CPU and the memory subsystem and monitors the data that is passed back and forth. Everything read from or written to memory is cached. If the same information is requested again, it is delivered straight from the cache. When the cache fills up, new data replaces old. Cache controllers typically use a least-recently-used (LRU) algorithm to determine which cache elements to replace and which to keep.

CHKDSK Confusion

Whenever I type the command CHKDSK /V to list all the files on a drive under DOS 5.0, I find that the only files it lists in the root directory are the two system files, IO.SYS and MSDOS.SYS. This seems odd because my root directory contains several other files. I also

Challenge

I SHARE A PC WITH TWO COLLEAGUES AT MY WORK SITE, AND I'M CONCERNED ABOUT THE PRIVACY OF SOME OF MY FILES. STORING THE FILES ON FLOPPIES PARTILY SOLVES THE PROBLEM, BUT I HAVE ALSO LOST SOME FILES WHEN A FLOPPY SOLVAS DAMAGED. HOW CAN I KEEP MY FILES SECURE ON A SHARED PC?

WILLIAM MOYS BURLINGTON, VERMONT

A number of hordware and saftware products on the morket provide security for a shared PC. What we're loaking farr with this Chollenge is a way to provide reasonaable security and privacy for a user's files an a shared PC. You might suggest ways to arganize files, ways to make files difficult to see ar find, or other ways you have overcome the problem of personal files an a shared PC. The Challenge winner will outline a comprehensive and creative set of solutions, Drop a letter to us marked "February Challenge". If we publish your salution, we'll convey our thonks by sending you a PC/Camputing "I salved the Challenge" Tshirt. Be sure to include your shirt sizes: S, M, L, and XI.

OCTOBER CHALLENGE SOLVED

In the October issue, you were Challenged by a WardPerfect user to came up with a macra that counted the lines in a text file. Of cause, WardPerfect has a bullish feature for counting lines of lext, and the responses we gat were divided: About half childed us far a Challenge whose answer was a feature of the program; the rest were macra—quite advanced, in same casse—that performed the count. The winner of the Challenge is David Fudge of Palm Bay, Flarido, who was the first of many to paint out haw to access the line-count feature in WardPerfect 5.1. Here's the procedure:

With the document an the screen, press Format (Shift-F8), Line (1), Line Numbering (5), Yes. Then set bath the Count Blank Lines and Restart Numbering an Each Page aptions to Na. Nate that WardPerfect daesn't show the line counts anscreen but will show them you print the document ar view it via Print Preview.

Our thanks ta Mr. Fudge and all the others for entering the Chollenge.

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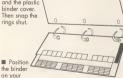
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NEC Technologies. ational Design

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Searching for updated drivers, solutions to installation problems

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rum or bulletin board service. Unless otherwise stated, the BBS access the CIS forums, log on to CompuServe and type G0 fol-

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owed by the forum name. Can't find a company on the list? Check CompuServe's Computer Club Forum (GO CLUB) or the (BM Users Network (GO IBMNET) for additional vendors. Last month the list covered vendors A-M; this month covers N-Z.

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or heavy scissors to cut off the bottom port of the binder that fits over horizontally placed function keys. Discord the bottom, and the rest of the binder will fit on your keyboard.



■ After positioning the binder, make a note of four places on your keyboard to attach Velcro tabs to hold your binder in place. Peel the adhesive backing off one side of each of the four tobs, and press them into position on your keyboard.
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tried this under DOS 3.3 and got the some results. What's wrong? Could I possibly hove found a bug in DOS?

ROBERT HAAS KINGSTON, RHODE ISLAND

Look at the listing produced by CHRIDSK V more closely. It does list all the files in the root directory; it just doesn't list them together. If the root directory contains files interspersed with subdirectories, the files in the subdirectories are listed before files that appear after the subdirectory names, CHKDSK processes files and subdirectories in the order in which it encounters them; it doesn't enforce any type of order.

In current versions of CHKDSK, there's no way to prevent this. However, DOS 5.0 users can list all the files on a disk, grouped by directory, by typing DIR\/S\/B.

The Perils of SETVER

Your onswer to Mr. LoGronge's question obout using DirMagic with DOS 5.0 in the September 1992 issue (Q&A, poge 341) was interesting and will probably solve his problem.

I have another solution. I encountered the same problem when I upgraded from DOS 3.3 to DOS 5.0. I solved it with the SETVER command, which, according to the DOS manual, "sets the MS-DOS reports to a program. If you are using a program that has not been upgraded to MS-DOS 5.0, you can odd its name to the version toble by using the SETVER command." I believe that it would be a service to all users of DOS 5.0, to bring this command to their attention.

CHESTER EDWARDS CHULA VISTA, CALIFORNIA

Or perhaps a disservice, depending on the program involved. SETVER can be either very helpful or very dangerous. It doesn't do anything to make a program compatible with DOS 5.0; it simply fools a program into thinking that it's running under an older version of DOS by reporting the version number you specify when the program asks for the DOS version.

DirMagic is one example of a pro-

gram for which SETVER is of no help. DirMagie was upgraded because DOS 4.0 and 5.0 support large disk partitions (those larger than 32MB), and large partitions are read and written differently from conventional disk partitions. SETVER does nothing to resolve the differences between these partitions; it just makes DirMagie think that it's running under a version of DOS that doesn't support large partitions.

The only valid use for SETVER is to let programs that check for a specific DOS version (for example, 3.3 or 4.0) run under DOS 5.0. Developers often build in such checks because their programs access low-level DOS data structures that may change from release to release. If the program is compatible with DOS 5.0 in all other respects. SETVER provides a convenient worksround to the version-check problem. However, if other incompatibilities exist, using SETVER could cause a system crash and data loss. If a program will not run under DOS 5.0. it's important that you check with the manufacturer before attempting to coerce the program into running with SETVER.

Fonts for Non-Windows Users

I recently purchosed an HP Losenputer, which I use primority to run WordPerfect. Without using Windows, who to ptions do I have to obtain screen fonts for the built-in printer fonts and for additional fonts I may want in the future? Which of these options offers the best combination of versatility, price, and speed?

THOMAS CHANG PITTSBURGH, PENNSYLVANIA

If you would like to take advantage of the growing growing library of ine-pensive TrueType typeface outlines, you might want to consider TrueType for DOS (899-95) from MicroLogic Software (510-652-5464) in Emery-ville, California. This product includes 36 TrueType typeface outlines (24 body faces, 10 display faces, and 2 symbol faces) that you can use from within WordPerfect, Microsoft Word, or Microsoft Words.

Besides scaling the fonts on the

fly, you can also add many effects, such as patterns, shadows, and backgrounds, to create a wide variety of impressions. And in addition to the included outlines, you can use any typeface in the TrucType format. Other high-quality TrucType packages include the ones from Bitstream (617-497-6222) and Monotype Typography (312-855-1440).

Jose, Can You Sea?

Con ony of your computer-progromming geniuses figure out a way to progrom o spell-checker that will question words that are spelled correctly but are the wrong words to use in o porticular context? Permit me to illustrate my point:

- I hove a spelling checker,
- It came with my PC.
- It plainly morks four my revue
 - Mistokes I connot seo.
 - I've run this poem through it, I'm sure your pleos too no,
- It's letter perfect in it's weigh, My checker tolled me sew.

Now, how do you fix something like this on a PC?

GERRY HOUSE-PETERS SAN JUAN CAPISTRANO, CAUFORNIA

As ewe sew succinctly point out, PCS dew a lot of things vary well, but understanding the subtleties of the English language is not won of them. We couldn't find any PC spell-checker or grammar checker that can completely correct your verse. If anyone has more information, please write to lettuce know if there is a whey around Gerry's problem.

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Awarded for Version 1.1 — Rated #1, PC Week, May 14, 1990; Excellent Value, InfoWorld May 22, 1989; Editor's Charge, PC Massages December 17, 1991, Readers' Choice, DBMS, December 1991, Best Buy. PC World, March 1990

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At first 1 backed off and priced out some programmers. Wow! Never mind. I'll try and do it myself. After surveying the numerous products out there I finally found the absolute best tool for creating custom applications - without the complications and time needed for writing code. Alpha FOUR - the database for Non-Programmers like me.

Alpha FOUR's Tutorial was magnificent - the best I've ever seen. In a few short hours I had the basics under my belt. I created my first database, complete with a colorful, custom screen and field rules that even capitalize the first letter of each word. It was incredibly easy.

From there I made my first application. Nothing to it. Alpha FOUR let me "paint" my menu, so you know it has lots of colors and looks good. Each menu selection starts a stored sequence of keystrokes (called a macro). For example, the "Find Customer" menu selection plays back the keys for 1) go to edit mode, and 2) go to find mode. When you select my menu item. a little box appears asking you for the customer's name. You enter it and the record is instantly found and displayed. It was very simple to create. And my application runs directly from the DOS command line

MAJE NIEU

With Alpha FOUR 1 can create custom applications in a fraction of the time 1 spend with other programs. It's the fastest, easiest database program I've ever seen.

Alpha FOUR has relational canabilities too; that means it can link up to 10 databases all at one time and make it look like they are one big database. That's important because you don't want to enter data more than once. Look at the Invoice screen I made for Solar Video on this page That's actually 3 separate databases: 1 for the invoice information, 1 for the customer information, and 1 for the tane information. If I didn't use a relational database, all that information would be in each invoice record. That would be one huge (and very slow) database. But with Alpha FOUR, I don't have to wor

Know what I like most about Alpha FOUR? It seems every time I need something, Alpha FOUR is right there with the answer It's always one step ahead. That's a good program. The kind that's perfect for people like you and me.

Speed, Speed, Speed, Speed - And More Speed! .That's the big news in Version 2.1. Faster performance thanks to a new concept known as Bullet's technology - that increases the speed of some indexes in Alpha FOUR by up to 70% over the previous version! Copy, export, global update, process reports and search faster than you ever thought possible. This Bullet technology is quite an impressive breakthrough!



I can relate 3 database files together for my invoicing application Alpha FOUR gives me what I need for serious applications

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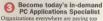
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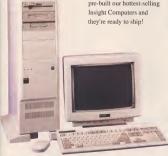
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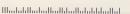


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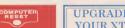
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No. Of course not. No way. Get out of Dodge. Uh-wil. What about knocking off Charlie Manson? No. (With a swastika whittled into his forehead, he wor't ever get paroled.) Ted Bundy? No. (It's too late, we already did him.) Rober 12 mer? No. (It's kind of too late, and he sometimes shows attractive people in his videos.) Saddam Hussein? Well... if I really couldn't get eaught... What and I saying? No. It's just not right, No. It's not fear of punishment that keeps you from taking a stroll down anarchy lane.

But that one's too easy, What if you could take all the money from any individual's bank account? Same rules as the hypothetical no-fault murder—you can't get caught. But whose bank account? Trump's? (Would you then forced to make payments to Ivana and invest in Maria's "Will Rogers' Follies?").

H. Ross. Percu's? (The presidential hobby didn't make a dent, and he has other bank accounts. He wouldn't starves,) No, I don't think you'd do that. It just doesny't feel right.

What if you could steal \$1 from every man, woman, and child in the U.S.? Most of them wouldn't even notice, but some would. No, it's not worth it, you don't really need \$242 million.

How bout \$1 from everyone who buys a copy of PC/Computing? (Yeah, 1 know the joke, most months we steal \$2.95 from every one of them.) Would they really miss it? Anyone who can't afford a chill dog is not buying a glossy collection of ads with sepia pictures of Dvorak. That's more than a cool million, cash—and remember—you can't be caught. Would you do that? It's wrong, that money doesn't belong to you, but it starts feeling kind of OK, doesn't it?

That's the problem with copying software. Dvorak wrote that it's just taking money from Bill Gates, and Bill has too much money anyway. But who deeides how much money is too much' Somalians might well think Dvorak has a bit "too much money." John's just wrong: "Prates don't steal from big companies, they steal from the people who pay for software. That's the real trickle-down.

The New York Times says the software industry loses \$2.4 hillion through bootlegging. Now some of those stolen programs just wouldn't be bought at retail prices, and some of that money might end up in Gates's pocket. Some would go into R&D (which means faster, harder, meaner, tighter, groovier toys). And some would lower retail prices.

If you steal software, you can't be caught. Some techles may find a way to make copying impossible, but they'd better hurry. As more stuff gets digital—like music—more can be duplicated perfectly, and that's less money for Warner Brothers (who really cares?), but also less for Lou Reed and George Romero (and that's bad). It also means higher prices each time you want to buy some "intellectual property" the straight and narrow was

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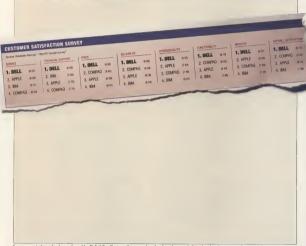
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